Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- ☐ Coloured covers/ Couverture de couleur
- ☐ Covers damaged/ Couverture endommagée
- ☐ Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- ☐ Cover title missing/ Le titre de couverture manque
- ☐ Coloured maps/ Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- ☐ Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- ☑ Bound with other material/ Relié avec d'autres documents
- ☑ Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- ☐ Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

- ☐ Coloured pages/ Pages de couleur
- ☐ Pages damaged/ Pages endommagées
- ☐ Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☐ Pages detached/ Pages détachées
- ☑ Showthrough/ Transparence
- ☑ Quality of print varies/ Qualité inégale de l'impression
- ☑ Continuous pagination/ Pagination continue
- ☐ Includes index(es)/ Comprend un (des) index

Title on header taken from:/ Le titre de l'en-tête provient:

- ☐ Title page of issue/ Page de titre de la livraison
- ☐ Caption of issue/ Titre de départ de la livraison
- ☐ Masthead/ Générique (périodiques) de la livraison

☐ Additional comments:/ Commentaires supplémentaires:

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
										✓	

THE CANADA FARMER

VOL. X. No. IV. (NEW SERIES.) | TORONTO, CANADA, FEBRUARY 28, 1873. | $1.50 PER ANNUM. SINGLE COPIES 8 CTS.

The Field.

The Potato Crop and the Colorado Beetle.

The eastward advance, during the past year, of this most destructive insect has quite justified our former predictions and warnings respecting it. We have very little doubt that there will be hardly a single county in Ontario free from its presence this year. Where it comes for the first time, its ravages will be but slight in extent and little noticed perhaps; but in all that western portion of the Province where the pest is now thoroughly established, we shall no doubt hear of its causing frightful annoyance and loss.

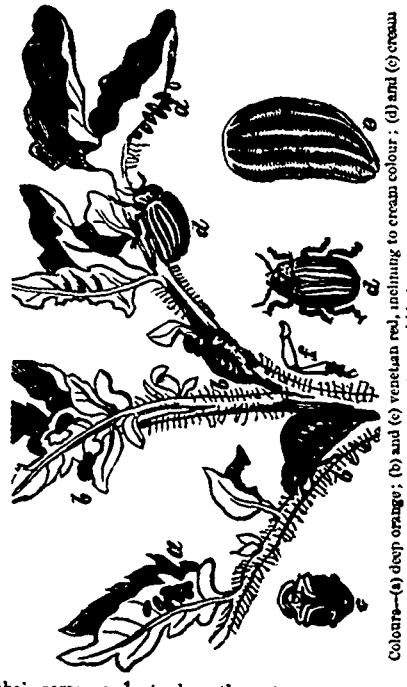
From the report of the Entomological Society of Ontario, we gather the following information respecting the progress of the Colorado Beetle during the past year. We reproduce an illustration of the insect in all its stages, in order that our numerous new subscribers may have an opportunity of recognizing the pest when it invades their fields, if they are not already only too well acquainted with it:

"During the past year we looked forward with considerable anxiety to the effect that the Colorado Beetle would produce on the potato crop; we are glad to be able to report that on the whole, less mischief has been done than we anticipated. It is somewhat difficult, however, to arrive at an accurate estimate. The Bureau of Agriculture forwards every year to the Secretaries of the Electoral Division Agricultural Societies a printed circular requesting a detailed return of the crops in each district; and if these returns were properly made they would afford much valuable information. It is to be regretted that they are not more universally attended to So far as we can learn only 40 of these returns have been made for 1872, and it is on these partial details that we must base our analysis for the Potato crop. While, however the ravages of the beetle have been somewhat less than we expected, its increase in numbers and onward progress have yet been such as to cause not only a material effect on the crop, but also to maintain a good deal of alarm amongst the farming community A comparison of the crop returns for the two past years fully confirms the statement made in our former reports, that the second and third years of appearance of the beetle are worse than the first.

A few statistics may not be out of place here. In 1871, 45 Agricultural Societies sent in returns shewing an average crop of 131 bushels per acre. In the past year, 1872, only 40 Societies reported, with an average of 118 bushels per acre. In 1871 only 14 societies reported the presence of the beetle, while 33 were free from it, and none badly affected. In 1872, 26 societies report injury from the beetle, and 8 report very serious damage, in some cases almost total destruction, and only 14 appear to be free. It is to be noticed that all the western places which in 1871 were the most badly affected, were in 1872 far more seriously attacked no one place do we find that the beetle after making its appearance one year, has not reappeared in the following season. In London the beetles literally swarmed, and thousands were daily trodden down on the sidewalks and streets, and we look for a still further increase next year

It would be very desirable to obtain statistics of the various sorts of potatoes grown, as we are quite satisfied from our own experience that some varieties are much more subject to attack than others, and we would beg respectfully to suggest to the Commissioner of Agriculture the propriety of obtaining such information during the coming season.

From the monthly reports of the agricultural department published at Washington, we obtain some information respecting the ravages of the Colorado Potato Beetle in the United States. The returns of



Colours—(a) deep orange; (b) and (c) venetian red, inclining to cream colour; (d) and (e) cream colour and black.

their correspondents show that the crop of 1872 was less than that of 1871, by about six millions of bushels. This, however, comprehends "sweet potatoes" as well. The western States, in which the potato crop had suffered for several years past from the ravages of the Colorado beetle, reported diminishing losses from that cause, and were the only States, North Carolina and Texas excepted, reporting increased production. In Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Nebraska, Missouri, Kansas, California, and Oregon, the average yield was only 98 bushels to the acre, while the average price on December 1, 1872, was 50 cents per bushel.

We give these statistics as it is from the Western States that the Colorado Beetle has worked its way, and they show to some extent what effect has been produced by its ravages for some years past.

The only sure remedy for the pest, besides hand-picking, which answers very well at first, is Paris green, mixed with fifteen to twenty parts of flour, or thirty to forty of plaster of Paris; the latter mixture is highly recommended by our friend Mr. Saunders, of London—no mean authority on such a subject.

Where the insect is likely to be abundant, our farmers should not attempt to grow a larger crop of potatoes than they can properly attend to, and exercise a constant vigilance over

Beet Roots for Sugar.

We seek to induce our farmers to produce for the sugar refiner, a rough sweet, made from the juice of the beet The farmer can grow such an article as will in the hands of the sugar refiner at once produce the finest loaf, and other sugars, whilst the farmer retains on his farm, the refuse of the roots for feeding and fattening cattle This refuse keeps well,—it has only to be stored in pits in the ground, like potatoes, and it can be preserved to the following summer, when it will be found a most valuable adjunct to the food of stock, particularly to milch cows during the season of scarcity of fodder Keeping renders the refuse more palatable to the stock, and also more nutritive than it is when first produced. It does not give a bad taste to either milk or to butter, and when preserved it comes in when the pastures are dried, and the cows fall off in their produce from scarcity of food.

The cultivation of the beet-root has a happy effect on the soil of the farm, and its various refuses afford the means of making so much manure, that in all the districts where beet-root is cultivated, the amount of wheat is often doubled, and in some instances more than doubled We speak of the produce of the districts in which the root is cultivated and is grown upon as great a scale as the necessary rotation of crops will allow The quantity of rough crude sugar produced per acre where the best sorts of beet are grown, is fully one eighth of the weight of the crop of beets raised If the farmer sells his roots, and they are of the best quality, he will receive for them from the person who reduces the roots to syrup, about four dollars per ton. If the farmer himself reduces the roots into syrup, he will make from them (according to the skill and care used) from seven to eight dollars per ton, leaving for his expenses in addition the leaves as green food, and also the pulp and other refuse The leaves should be ploughed under as manure for the succeeding crop.

Before all however it is necessary that the *kind* of beet sown should be of the richest and sweetest nature, and seed of this kind can only at present be obtained from the great seedsmen in London, England, and from the continent of Europe. Carter's nursery prize sugar-beet as grown at Lavenham, Sussex, England, has produced as much as thirteen and a half per cent. of refined sugar, and the kind known as "Vilmorins" has produced as much as fifteen per cent.; and we have seen accounts of even more. To show the care with which this seed is

raised in Europe we may mention the process resorted to, to insure the best quality of root. As in cattle and all other natural productions, so it is with seeds, "*like produces like.*" The best and richest roots produce the seeds which produce the greatest amount of sugar in the future crop; but as every root is a perfect plant, so every root must be tried, and its quality ascertained before it is planted for seed. To do this the seed grower (who values his character for the production of the best seed,) takes each root, punches out a piece of it, and reduces the piece so punched out to pulp and juice; by the use of extremely delicate instruments, the specific gravity and consequent sweetness of the juice of each root, is ascertained; those which are found deficient are rejected, and the best are planted for seed. The rootlets of each beet-root grow on opposite sides in two longitudinal rows; the trial piece of the root is punched out from between these longitudinal rows of rootlets; the hole so made heals sufficiently to prevent the decay and destruction of the root when planted for seed, and the future growth of it for seed is not materially injured By this means a sort of seed is secured, which produces the greatest possible amount of sugar, and this is how the average yield of sugar has been increased from five or six per cent. to as much as fifteen per cent., and even more in the future crop. This was the plan adopted by "Vilmorin," of Paris, and his seed has now, as well as Carter's, attained a European reputation.

We mention this to show that everything depends on the quality of seed to be obtained, and neither pains nor expense ought to be spared to procure the best. The best German seed growers also produce a seed of equal quality, but they are not within our reach Carter & Sons, Sutton & Co'y and others of the same class and respectability in London, England, will always obtain for their customers the best seed.

In Germany the excise duties are collected on the amount and weight of the roots manufactured. In France the duty is collected on the amount of sugar actually produced. Consequently the Germans grow the richest and sweetest roots, (irrespective of the amount of roots produced per acre,) whilst in France they grow the kind of root which will produce the most sugar per acre. The Germans cut off and reject all those parts of the root which are poor in sugar, whilst in France the whole root is worked up except the crown.

Having procured the best seed, the next thing to do is to grow it in the best manner, and in this the European and English farmers spare no expense. From 16 to 20 tons of the best farm yard manure per acre are put on the land in the fall, and well and deeply ploughed under, the spring following the land is lightly ploughed, about sixteen hundred pounds of rape cake having been first sown on the land. Land manured in this manner will not only give the richest quality of beet-root, but will the year following without any other kind of manure produce the finest possible crop of wheat. Where the leaves and tops of the beet-root are left on the land and ploughed under, a less quantity of rape cake is used.

The roots are dug and stored in the same manner as mangolds or turnips. The sugar beet is not readily affected by frost, and continues green in the field long after every other summer plant is cut down by the frost.

The sugar beet may be sown the very first thing in the spring; indeed, the earlier the crop is sown, the sooner will the roots be ready for the mill, and early manufacture saves all the expense of pitting and storing, and gives the quickest returns to the farmer.

Summer frosts do not injure the sugar beet. The year before last, they had a very bad summer frost in Wellesley, which even cut down the weeds; but the sugar beets though in full leaf, were neither destroyed nor even checked in their growth. The roots, too, when pitted, will stand much more frost than has been supposed possible; the roots will suffer far more from growth and heating than from frost during winter storage.

With respect to the manipulation of the juice, we refer our readers to Mr. Cull's recent pamphlet on the subject, and to Crook's work, published in 1870, with plates, in which work all the processes are fully and exhaustively treated on. Some most valuable information is also to be had from the numbers of the *American Chemist*, for July and August, 1872, where the subject is admirably treated by Professor Goessman, Ph. D., of the Amherst (Massachusetts) Agricultural College; these two papers are the more valuable, as they treat of the sugar beet as grown on this continent, and in a climate very similar to that of Canada.

Sugar refining has always been a most profitable business, and is one in which very few failures occur. The utensils however, are expensive, and the capital necessarily invested in bone-black, or animal charcoal, is always large; but the profits are large and certain, and in well conducted establishments no waste occurs, the whole of the substances contained in the rough sugar, being convertible, and converted into good merchantable matter.

If sugar is obstinate and won't crystallize, or even if it is so injured as to be rendered uncrystallizable, a certain and good value is always obtained in the shape of syrups and molasses, and other sweets. The Glasgow (Scotland) refiners have brought their business to such perfection, that no syrups whatever, are made; everything is reduced into crystallized sugar in one shape or another. It is too much however to expect such success as this in Canada yet awhile; but there is with us a regular and constant demand for syrups and molasses, far more than there is in the old countries.

Beets do not produce their full equivalent of sugar on peaty land, or on new soils. They want a rich deep clay and sand-loam, or any rich *old* soil *well manured* the previous year, but by no means manured with rank manure in the same spring in which the seed is sown.

Twenty years ago the manufacture of beet-root sugar was confined to France and a part of Germany, —for home consumption Now, the various European countries produce more beet-root sugar, than the tropics produce cane-sugar,—and more beet-root sugar is now refined in Glasgow and London, than used to be grown in all France twenty-years since

It is simply absurd to be sending our money out of the country to purchase sugar which we can produce here at a cheaper rate, and at an excellent profit to all concerned in the business, from the farmer who grows the roots to the refiner who turns the rough produce into the loaf and other refined sugar, which we daily make use of to so great an extent.

Saving and Application of Barn-yard Manure.

In reply to a correspondent, our able cotemporary of the Albany *Country Gentleman*, thus gives his opinions on these highly important points:—

Manure taken fresh from the stable, with but little admixture of litter, should be placed under shelter; if exposed to rains, a portion would be washed away and wasted. If there is danger of the heap fermenting too strongly, so as to waste and injure the manure, of which every owner can judge best on the spot, it may be prevented by composting it, or alternating it with layers of turf, loam, muck or peat, &c.; turf being preferable if accessible. The thinner the alternating layers of manure and absorbent, the better. Fermentation is also retarded or prevented by spreading it broad and flat under cattle sheds, where it will be trodden hard by the animals. But if the manure contains a large portion of straw litter, as usually happens on grain farms, it will be likely to become too dry to ferment sufficiently to break the fibre, if heaped under shelter, and exposure would be better. After the strawy heap has fermented several weeks, the sides should be cut down with a hay knife and thrown into the middle, so as to give all a chance to ferment. The degree of exposure to rains, and the desired amount of fermentation to reduce the manure, without injuring it, must be judged by every farmer by personal examination. Hence the impossibility of giving any rule, either for exposure or shelter, that can be blindly followed.

The great object in applying manure, is *to diffuse it as intimately as possible through the particles of the soil*, where it can be reached by all the thread-like roots of the plants. Experiment has shown that when manure is finely broken up by the harrow or clod-crusher, and well mixed with the soil, its effects are doubled or tripled, as compared with the common way of spreading it in lumps, and simply plowing under or half covering. Now, the most perfect diffusion through the soil is effected by using *liquid manure*, which soaks down and goes among the finest particles. The easiest way to use and apply liquid manure, is to spread solid manure over the surface of the ground, and allow the rains of late autumn, winter and early spring, to wash the soluble and richest portions down into the soil. If evenly and thinly spread, at this time of the year, it will not ferment and waste; but it will, if left in heaps. More than twenty years' experience has shown us that manure may be applied to the surface, under proper circumstances, with great advantage. It succeeds better on heavy than on light soil. Our practice has been to plow it under in spring, after it has been thoroughly washed by the rains of the previous months, and thus secure all its value. The most successful application of this method of top-dressing has always been to the corn crop. The results of a large number of experiments go to show that, on an average, manure is worth twice as much applied in autumn to sod intended for corn, as when applied the following spring just before turning over the sod. The process of the intimate diffusion of the manure has been going on for months whenever the surface was not actually frozen; but when the manure is applied just before plowing under, there can be but very little intermixture with the soil. It should be distinctly and well understood that the top-dressing here recommended must not be in large lumps scattered irregularly over the grass, but the whole should be finely and evenly spread, for which purpose we have found the slanting-tooth smoothing harrow, the best implement, doing the work perfectly and more rapidly than ten men.

There may be instances when the manure may be washed away if applied on snow. If the whole surface were covered with snow converted to ice, a heavy rain on this ice might easily wash much away, but we have not met with any instance of this kind. We have often spread manure on snow, and in every case when there was enough water on the surface from rain or melting snow to wash any of the liquid portions, there has been at the same time enough of the surface thawed to absorb the whole—a tenth of an inch being enough to absorb all that will commonly wash at first over the surface. It must be borne in mind that heavy or clayey soils absorb more readily and copiously than light or sandy soils, and are more benefited by the surface manuring. In order to test the truth of the opinion that the manure would be washed down hill-sides, a number of manure heaps were placed in such a position, and allowed to remain there for some months, including the most rainy season of the year. The grass below the heaps, and in close proximity to them, was rank and green; but five feet distant not the slightest effect could be perceived.

Indian Corn—New Plan.

The universally accepted mode of planting Indian corn has heretofore been in hills 3 feet, 3½ feet, or 4 feet apart, with 3 or 4 stalks to each hill—or in drills from 2 to 3 feet apart. Mr. Samuel R. Hough, of Manchester, Ill., however, suggests a new plan which he has tried for two years and found most successful. In a letter to the *Iowa Journal*, he says:—

"In one corner of my garden which had been newly taken in and had not yet received any more manure than the surrounding land, I prepared a small spot of ground. It received no more attention, and was in no wise in any better condition, than the adjoining field. The corn in the field was planted about the 10th of May, with a corn-planter which dropped from three to five grains to the hill. It received five ploughings. The summer was an almost rainless one in this part of the State and we were visited with clouds of 'chinch bugs.' The corn in the field yielded about thirty bushels per acre. After I had finished planting my fields I remembered my garden spot was not yet planted. About the first of June, I marked it off and dropped the corn, making the hills two feet apart each way. As soon as the corn made its appearance, it was thinned to one stalk in each hill. It was never plowed but received two hoeings I measured the ground and the corn and it yielded 90 bushels to the acre. I am satisfied that, if farmers would take the time to plant their corn with exactly the same number of grains in each hill, and let that number be very small, that they would not only increase the yield of their fields in quantity but improve in quality."

Grasses and Forage Plants.

Turnip Crop of Aberdeenshire.

It may be interesting as well as useful to many of our readers to know how turnips are grown in places where no labor or cost is spared to secure large crops of good roots. We have before us the annual report of the Turnip Growing Association of Aberdeenshire, Scotland, for the year 1872, which was organized in 1857, and has kept careful annual records of the crop, and the cost of growing it, ever since. There were 93,603 acres last year sowed for turnips in Aberdeenshire; and as examples of the quantity of manure used for Swedish turnips, we have the following:

On the farm of Ardtannes, 22 yards farm-yard dung; and 392 lbs. of Langdale's challenge manure. Estimated cost of manure, $30.79 cents per acre.

On Crichie, 18 yards farm-yard dung; 8 bushels mixed bones, and 112 lbs. guano. Estimated cost $30.16 cents per acre.

On East Balhaggardy, 14 yards barn-yard dung; 10 bushels mixed bones, and 224 lbs. turnip manure. Cost $28.90 cents per acre.

And here are examples of the style of manuring for green-top yellow turnips:—

On West Balhaggardy, 14 yards farm-yard dung; 6 bushels bone-dust, and 336 lbs. Langdale's challenge manure. Cost per acre $27.33.

On Upper-boat, 18 yards farm-yard dung; 224 lbs. dissolved bones, and 224 lbs. Langdale's challenge manure. Cost $26.91 per acre.

On Conglass, 17 yards farm-yard dung; 7 bushels bone-dust, and 224 lbs, Langdale's challenge manure. Cost $29.16 per acre.

On Crichie, 15 yards farm-yard dung; 4 bushels mixed bones; 112 lbs. guano, and 112 lbs. Langdale's challenge manure. Cost $28.45 per acre.

The report of the society states that the season was most exceptional for the enormous rainfall, and the worst for turnip growing since the society was instituted. The average crop of Swedes over the country fell 8½ tons below the average of the previous six years; and that of yellow turnips 6½ tons. Let it be noted, however, by Canadian root growers, that notwithstanding the fearfully bad season, the average crop of turnips got in 1872 from 93,605 acres, in Aberdeenshire was 12¾ tons of 2240 lbs., or 14¼ tons of our weight per acre.

The following is the statement of the society of the annual cost of manure, and the annual weight of Swedish turnips in the county since the year 1857, reduced by us to Canadian weights, and money currency:—

	Weight of Crops.	*Cost of Manure.*
1857	24½ tons.	$23 75 per acre.
1858	23½ "	22 60 "
1859	12½ "	21 68 "
1860	24¾ "	23 06 "
1861	29¾ "	24 02 "
1862	21½ "	23 85 "
1863	24½ "	23 58 "
1864	24¾ "	23 75 "
1865	22¾ "	24 40 "
1866	27 "	22 98 "
1867	21½ "	23 52 "
1868	21½ "	23 10 "
1869	25¾ "	23 94 "
1870	25¾ "	25 52 "
1871	24½ "	25 56 "
1872	14¼ "	26 77 "

During these sixteen years, therefore, the average crop of Swedes in Aberdeenshire was 23 tons of 2000lbs.—and the average cost of manure was $23 88 per acre. In Aberdeen, turnips are valued for ordinary cattle feeding purposes at $2 per ton; the crop therefore yielded double the cost of the manure, besides cleaning and enriching the land for the succeeding grain crops.

We are persuaded that on suitable land, and with the same preparation of the soil, and similar manuring, an equally high average to this can be attained in Canada, and that the value of the crop per ton is much greater here than in Scotland, whether for feeding purposes or preparation of the soil for succeeding crops.

When shall we have in Canada a reliable annual return of our farm crops? It would be invaluable if we had it.

Orchard Grass.

This grass (*Dactylis glomerata*) known in England as Rough Cock's-foot, flowers in dense clusters. Its stem stands erect and grows three feet high. It is a perennial plant—flourishes in fields and pastures—and flowers on this continent in June and July; It is much grown and greatly valued in the New England States. Judge Buel, the eminent agriculturist of New York State, said of it:—

"It is probably better adapted than any other grass to sow with clover and other seeds for permanent pasture or for hay, as it is fit to cut with clover, and grows remarkably quick when cropped by cattle. Five or six days' growth in summer suffices to give a good bite. Its good properties consist in its early and rapid growth, and its resistance of drouth; but all agree that it should be closely cropped. Sheep will pass over every other grass to feed upon it. If suffered to grow long without being cropped, it becomes coarse and harsh. Colonel Powell (a late eminent farmer of Pennsylvania), after growing it ten years, declares that it produces more pasturage that any other grass he has seen in America. On being fed very close, it has produced good pasture after remaining five days at rest. It is suited to all arable soils. Two bushels of seed are requisite for an acre when sown alone, or half this quantity when sown with clover. The seed is very light, weighing not more than twelve or fourteen pounds to the bushel. It should be cut early for hay."

Mr. Sanders, a well-known practical farmer and cattle breeder, of Kentucky, says of it: "My observation and experience have induced me to rely mainly on orchard grass and red clover; indeed, I now sow no other sort of grass-seed. It is nutritious, and well adapted as food for stock. Orchard grass is ready for grazing in the spring ten or twelve days sooner than any other that affords a full bite. When grazed down and the stock turned off, it will be ready for re-grazing in less than half the time required for Kentucky blue grass. It stands a severe drought better than any other grass, keeping green and growing when other sorts are dried up. In summer it will grow more in a day than blue grass will in a week. Orchard grass is naturally disposed to form and grow in tussocks. The best preventive is a good preparation of the ground, and a sufficiency of seed uniformly sown. The late Judge Peters, of Pennsylvania,—who was at the head of agricultural improvement in that state for many years,—preferred it to all other grasses."

The editor of the Massachusetts *Ploughman* says of it: "Orchard grass may be sown with red and alsike clover, say five pounds of red clover seed and five pounds of alsike. If only red clover seed is used it ought to be at least ten pounds to the acre and fifteen is better. But alsike seed is much smaller than red clover seed and you get a vastly greater number of plants. Alsike will not show a great deal the first season. If you sow red clover it ought to have a fair crop the first year and when it begins to disappear the second year you will find the alsike. Orchard grass grows more rapidly after being cut or fed off than any other grass we know, but the second crop does not send up flowering stalks, and does not, therefore, grow so tall and imposing as the first crop, but it grows thick and makes a bulky, though not so very heavy a burden. Sowing it very thickly prevents it from growing so much in clumps and gives it a finer growth. Two bushels of seed to the acre is little enough and more would be better. With orchard grass, clover and alsike the cost of the seed will be rather greater than Timothy and red top, but if you have never grown this grass we advise you to try it. Sow it as early in the Spring as you can, give it a good chance and you will see how you like it. But do not make up your mind till the second year, when you will like it, we think.

Messrs. Lawson & Son, the extensive seed merchants, of Scotland, say of it: "It grows in meadows, pastures, bushy places, and waste grounds. It is one of the best and most productive pasture grasses, of which a strong growing variety is known under the name of "giant cocks-foot."

Mr. Flint says: "It is one of the most valuable and widely known of all the pasture grasses."

Is Pea Straw Good Food?

A correspondent says he has not found pea straw as valuable for fodder as good oat and barley straw. Very likely. And yet good pea straw may be so cured and fed as to be worth far more than any other straw, unless it is choice bean straw. It is rich in nitrogenous than wheat, oats, barley, or rye straw, and should be fed, to get out its full value, in connection with a small quantity of corn. Sheep that have a pound of corn each day will fatten more rapidly on pea straw than on wheat or oat straw. The better plan is to let them have all they can eat of both pea and wheat straw—say pea straw morning and noon, and wheat or oat straw at night. But we apprehend the trouble with our correspondent is not so much in the way of feeding, as in the method of cutting, curing, and preserving pea straw. If the peas were allowed to grow till dead-ripe, and after cutting were allowed to remain in heaps in the field day after day without turning, and were exposed to rains and dews until nearly all the soluble matter was decomposed or washed out of the straw, and half the leaves were knocked off them before they left the field, and they were stacked in a damp condition, it is not difficult to understand why "sheep and the chemist do not tell the same story" in regard to the value of the straw. On our own farm we have found pea straw from a luxuriant crop of peas, cured without rain, nearly as valuable as clover hay.—*Farmers' Union.*

Grasses.

Among the grasses said to be the most profitable for mowing, are timothy, red-top, white bent, orchard grass, perennial rye grass, June grass, rough-stalked meadow grass, fowl meadow grass, meadow fescue, and tall fescue. The artificial grasses comprise red, white, and other clovers, and some others not cultivated in this country. It is said that the grasses cultivated in England for the use of animals comprehend not less than two hundred varieties; but in America there are not more than twenty.

A greater weight of grass and hay can be obtained from an acre by using several judiciously selected species, than if one or two are used; since different species require different kinds of nutriment and the number of one species which will grow to vigorous maturity on a square foot of soil, will not be diminished by the growth on the same soil of plants of different species requiring different substances to support them. But in selecting the mixture for *mowing* or for *pasturage*, regard should be had to the modes of growth and other peculiarities of each kind. Some grasses are well adapted to cut for hay, but are not so suitable to form pasture-turf. Timothy is not so good to sow for pasturage, as it cannot bear the close cropping of cattle, though one of the best of our grasses for mowing.—*My Little Book.*

NUTRITIVE VALUE OF GRASS.—Some interesting experiments have been made by the German chemists, on the nutritive value of meadow grass at different points of its growth and upon hay cut at different seasons. An elaborate series of analyses show that young grass is more nutritious than mature grass, and more easily digestible. Thus grass 2½ inches high contains nearly 50 per cent. more of albumenoids than grass which is 6 inches high, and about 10 per cent. more of "crude fat" (5.24 per cent. against 4.82). The mature grass contains more woody fibre and less ash than the young grass, and besides this, it is found that the nutritious albumenoids exist in a less soluble form in hay than in young grass. Hence the difference of nutritive value and digestibility. Autumnal hay was found to be more nutritious and digestive than summer hay. English agriculturists must make some qualifications to this result, inasmuch as it was obtained from German hay, grown in a much drier summer climate than ours. Similar experiments were made by E. Wolff on clover. He found that its digestibility diminished during the four weeks from the beginning to the end of flowering, while the digestibility of clover hay was about the same as that of green clover cut at the same stage of growth. The moral of this is obvious: Don't be greedy with your hay crops, by leaving them to grow so very tall. By so doing you not only lose the seed, which if fully ripe falls on the ground during harvesting, but you also obtain a less nutritive and digestible blade and stem. Better cut early, and utilize the after-grass.—*Prairie Farmer, Feb. 8, 1873.*

Agricultural Chemistry.

AIR.

We have seen that phosphorus will burn in oxygen with great brilliancy uniting with the oxygen to form an oxide of phosphorus When phosphorus burns in the air it unites with the oxygen of the air to form the same compound If the combustion takes place in a jar of air standing over water the phosphorus, if in sufficient quantity, will burn up all the oxygen and the water will rise in the jar to fill its place. It will be found that the water will now occupy one-fifth of the space formerly occupied by the air. The remaining four-fifths of the jar contain a gas, which, though not differing to the eye from oxygen or hydrogen; will neither burn nor support combustion. This gas is nitrogen and we see by this experiment that atmospheric air consists of four volumes of nitrogen and one volume of oxygen More accurately air contains 21 volumes of oxygen, and 79 of nitrogen. Nitrogen can best be described by its negative properties It has neither color, taste, nor smell. It is not combustible, and it does not support combustion. It will not support respiration, and animals placed in an atmosphere of pure nitrogen soon die, but it has no poisonous properties, and it may be breathed without injury It is not quite so heavy as oxygen, but is fourteen times as heavy as hydrogen In the air it serves to dilute the oxygen, which, if pure, would act with too much energy. Animals, as we have seen, would soon die in pure oxygen, but the atmosphere is exactly adapted to their condition, containing the oxygen, without which they could not exist, diluted by the nitrogen so as not to be injurious. The symbol of nitrogen is N.

The air is not a chemical compound but a mixture of the two gases which compose it. Chemical compounds differ in their properties from their constituents, but the air has all the properties which we should expect from a mixture of oxygen and hydrogen in the proportions in which we know them to exist in the atmosphere. The two gases, however, are always found in the same proportions. This depends upon what is called the *diffusion of gases*. If two gases are brought into contact they have a tendency to mix together and to remain so. This diffusion takes place even in opposition to gravity. So that if a jar of hydrogen be inverted over a jar of oxygen, although the oxygen is sixteen times as heavy as the hydrogen, it will rise into the upper jar, and the hydrogen will sink into the lower jar, until there is as much of each gas in one vessel as in the other If it were not for this curious property, the oxygen in the atmosphere would all sink down to the earth's surface, and the nitrogen would float above it, and all its advantages as a diluent for the oxygen would be lost.

So perfect is this diffusion that air in the midst of large cities, where oxygen is constantly being taken from it in large quantities contains practically the same proportions of oxygen and nitrogen as the air of a mountain top.

Oxygen and nitrogen make up the great bulk of the atmosphere, but there are also found in it a variable amount of the *vapour of water*, a minute quantity of *carbonic acid*, and a trace of *ammonia*.

From the surface of the sea, and of every lake, river and pond on the surface of the earth, water is constantly ascending in the form of vapour into the atmosphere. This vapour diffuses itself through the air in obedience to the law that has just been stated. and consequently aqueous vapour is present in every part of the atmosphere. The quantity present depends greatly upon the temperature The hotter the weather the greater the evaporation, but even on the coldest days this process is going on and vapour arises even from ice and snow

At the close of a hot day the air becomes highly charged with moisture, and when such a day is succeeded by a cool night a portion of the aqueous vapour present in the air is deposited as dew. Clouds hinder the cooling of the earth, and hence the greatest quantity of dew falls on a clear night after a hot day. In the autumn when, although the days are warm, the nights are very cold, this moisture is frozen as it is deposited, and forms hoar frost. When plants are covered by a piece of matting or a board to protect them from the frost, these do so in exactly the same way as the clouds prevent the deposition of dew, by hindering the radiation of heat from the earth, and in this way preventing it from cooling down so much as it otherwise would do. When there is a considerable accumulation of aqueous vapour in the air it falls down as rain, snow or hail. The rain sinks into the ground from which it issues again in spring, and flowing thence into rivers and lakes is at length carried back into the sea, from which it originally came.

Plants exhale a large quantity of water from their leaves. A sunflower three feet high was found to give off from twenty to thirty ounces of water every twelve hours. The quantity of water exhaled by plants depends very much upon the temperature and upon the dryness of the atmosphere. The average amount of aqueous vapour present in the air is about one and a half per cent. by volume.

Air contains about 0·04 per cent. of *carbon dioxide*, or as it is commonly called *carbonic acid*. This substance is formed when carbon burns in oxygen or in air. It is also a product of the respiration of animals. It consists of 12 parts by weight or one atom of carbon in combination with 32 parts by weight or two atoms of oxygen and is represented by the formula CO_2. It may be readily obtained by acting on marble which is a *carbonate of lime* with hydro-chloric acid in the same apparatus which was used for hydrogen. It is a colorless gas with a peculiar pungent odor one and half times as heavy as air. If a lighted match be plunged into it the flame is instantly extinguished. Even when largely diluted with air it possesses this property of extinguishing flame. It is highly poisonous when breathed, producing suffocation. Hence, if it were not carried away by diffusion its presence in the atmosphere would be attended by most injurious results, as on account of its great weight it would accumulate at the surface of the earth particularly in towns where it is formed in large quantities, by the combustion of wood and coal which consists largely of carbon, and in respiration.

Animals exhale carbonic acid in breathing. Plants on the other hand absorb it from the atmosphere. It forms, indeed, an important portion of the food of plants. We see, thus, how the animal and vegetable kingdom, are dependent on one another, plants absorbing carbonic acid from the atmosphere and giving out oxygen, while animals absorb oxygen and give out carbonic acid.

Effect of Fertilizers in Different Seasons

The editor of the *Boston Journal of Chemistry*, in giving the results of his farm operations the past season, says:—One of the most interesting facts which this extraordinary wet season has brought out is, that fertilizers applied to soils in dry summers without appreciable effects, are rendered available in those that are wet. The plats upon which our fertilizers have been applied during the past years, when the rainfall has been so deficient, produced wonderfully this season. The fertilizing substance have been lying dormant in the soil for the want of water to render them soluble or to hold them in solution, and this year the conditions have been favorable for promoting the changes, chemical and mechanical, necessary for plant food to be made available. Owing to the dry weather the past three years, it has been difficult to conduct experiments with manures, and reach anything like reliable results. Hundreds of farmers have been misled, and have condemned as worthless manurial substances which had positive value, but which needed the usual meteorological agencies to render them assimilable. Farm dung and stable manures, as well as chemical fertilizers, have not exerted their full influence upon soils to which they have been applied, because of the absence of rain. This season they have been thoroughly subjected to the action of water, and crops have been benefited by the dormant manurial agents applied two or three years ago. Manures are not lost which do not act promptly, unless they are blown away by winds, or are washed into brooks in sudden and violent showers, which sometimes fall upon the baked earth in summer. If they remain in or upon the soil, favorable seasons, which are sure to come, will force them to give up to plants the food they contain, and the husbandman receives his returns in abundant crops.

Entomological Department.

Insects of March.

The month of March is so uncertain in its character in this country, that one can never predict before hand what weather we may expect, or even what work may be done; sometimes it is warm and genial like spring, with only occasional variations of light frost and soft snow; while another year it is rough, cold and tempestuous, rivalling January in its severity and adding the violence of equinoctial gales to the bitter frosts of winter. The animal as well as the vegetable creation is affected by the condition of the weather, and all the hybernating and migratory forms, with few exceptions, only make their appearance when the earth is renewing her verdure, and the sap is swelling the buds of the trees. Thus, then, we cannot say beforehand what birds or insects we may expect to meet with during this month, any more than we can say whether we shall be gathering shamrocks on St. Patrick's Day, or be sleigh-driving on All Fools' In spite of the uncertainty, however, of this most fickle month we may venture to give a few hints regarding the insect world and the precautions that a careful farmer or gardener may wisely take.

FIG. 1.

On any pleasant warm days in March, the orchardist should go round his fruit trees and scrape off the loose bark from trunk and limb; by so doing he will get rid of many a Codling-Worm cocoon and other noxious insect; he should also be especially particular where he finds the tree affected by the injurious Bark Louse (Fig 1.), under the scales of which lie concealed the eggs of the next season's brood. This is work that may be done on any mild day, but for this operation should be selected a day when the sun is obscured, and there is no glare from sky or snow to affect the eye-sight.

The operation we allude to is the search for the egg-belts of the destructive Tent Caterpillars (Fig. 2.) and for the cocoons and eggs of the Tussock Moth. The former, as shown in the illustration, are deposited in the form of a bracelet or belt, to the number of two hundred or more, around the terminal shoots or twigs of a large number of our fruit and forest trees They are laid by the parent moths, (*Clisiocampa Americana* and *C. Sylvatica*) in the middle of summer, and are protected from the weather by a thick leathery varnish Before spring comes on and while the trees are destitute of foliage, they should be searched for on apple and other trees, and when found cut off or burnt. A little practice will soon enable one to detect them. A few hours devoted to this work now will save much time and loss later on in the season.

FIG. 2.

While searching for the egg-bracelets, notice should be taken of all dead leaves hanging on the apple, pear and many other fruit trees. These will be found on close inspection to contain in a majority of instances the empty cocoon of the Tussock Moth, enclosed in a coarse and loosely-woven web. A large number of these cocoons will be found to have upon them a hard white froth-like substance, which covers and protects a large mass of eggs. By gathering and burning the dead leaves the eggs from which a brood of destructive caterpillars would before long be hatched, will be effectually exterminated.

Any straw, loose boards, or other rubbish lying about the roots of fruit trees should be turned over and examined as the season advances; under them will often be found numbers of the cocoons of the Codling Moth, and caterpillars and insects of various kinds.

Towards the close of March, house-flies, bees and

wasps often make their appearance if the weather be propitious. The collector of insects will then be able to commence his pleasant labors, finding perhaps a prematurely awakened specimen of the Camberwell Beauty (*Vanessa Antiopa*), or other hybernating butterfly; an occasional Tigerbeetle (*Cicindela*), perhaps on a sunny bank, and under barks and logs many a beetle or bug that has lain torpid during the winter, and is now beginning to bestir itself, enlivened by the genial warmth of sunny spring. Anything new or strange to the observer in the way of insect life, about which he desires information, we shall be glad to inspect and tell what little we may know about it.

Hybernation of Insects.

In gathering a few chrysalids of the small white cabbage butterfly (*Pieris rapæ*) from the side of my barn to-day, I could not avoid being led into a train of thought regarding the hybernation of insects. The worms which only a few weeks since were feeding upon my cabbages, have, through their natural transformations, become small, whitish chrysalids, each carefully fastened with a silk thread to the side of some board, stick or weed, where they withstand all the changes in the weather unharmed. This morning the thermometer marked two below zero, and my little chrysalids were frozen so hard that they would break as readily as a piece of glass; but the warm sun shining upon the side of the barn soon thawed them out, and if touched they wriggled about, and showed signs of life. At night they will again be frozen, and so on until spring, the alternate freezing and thawing neither injuring nor destroying life.

But in the common acceptation of the term this passing the winter in the chrysalis state is not hybernation, and I only mention this instance to show the wonderful tenacity of life in such minute creatures. We have, however, several species of butterflies and moths that hybernate in their perfect or imago state, passing the long, dreary winter in some crevice of rock, under the loose bark of a tree or old log, coming out in the spring unharmed by their long and apparently uncomfortable rest. Every one must have found the little lady birds concealed in mauve nests in the old and withered grass in winter; also our Northern squash beetle (*Epilachna corealis*, THUMB), hid away in old, dry, and half-rotted trees. The common squash, or stinking bug (*Coreus tristis*), can also be found around the barns, and other outbuildings almost any day in winter. If we go into the fields during a thaw and turn over flat stones or old logs we find many species of beetles that must have been somewhat chilly if not frozen solid during the coldest weather. Most of these insects sought their hybernacula during the warm days of autumn, and as they lay up no food to eat, it is quite evident theirs is a long fast.

The positions in which different insects place themselves in their winter homes is also worthy of study. Many of the *Carabidæ* cling to the under side of stones with their backs downward, and when we suddenly uncover them in cold weather we find them lying on their backs. Others rest in a natural position, with their feet downward, while those with long slender bodies and short abortive wing-covers (*elytra*), like the rose beetles, coil themselves up. Again we find other species congregating together, apparently for the sake of company or for mutual protection. I have found this to be particularly the case with various species of the *Harpalus* and *Brachinus*, among what are termed ground beetles, while the same thing occurs among the *Tenebrionidæ*, which are found in old half decayed wood. Many of the curculios hybernate, and I have frequently found the corn curculio (*Sphenophorus Zea*—WALSH) assembled under loose sods and soft, flat stones; but whether this was merely accidental, or for the sake of company, of course I do not pretend to know. During the coldest weather the animal function must cease, and these insects neither breathe nor have need of air, consequently their hermetically sealed prison of snow and ice is not an uncomfortable abode.

A few warm days in winter may awake them, but they are too wise to leave their retreat until the proper season arrives, or, to put the thing upon a practical basis, until their natural food is to be procured. Those who feed upon grass and roots will appear a month before those that feed upon the leaves of deciduous trees and shrubs. Everything natural seems to move along smoothly and harmoniously, and it is only when man puts his oar in that the good old ship runs upon the rocks and is lost among the breakers, carried there in the fog of theories.—*W. R. L., in Rural New Yorker.*

Yuccas and Insects.

At the last meeting of the American Association Mr. Riley stated as a discovery of Dr. Engelmann, that our American Yuccas could be fertilized only by means of some artificial agency, and that an insect was engaged in the work. This insect, a moth, was described by Mr. Riley as one hitherto unknown to entomologists, and one by its structure well calculated for its work. The insect collects the pollen which would not otherwise reach the pistil, and places it upon that organ and lays her eggs. The young larva after hatching eats its way into the developing fruit, lives on the maturing Yucca seeds, and by the time the seed-pod is ripe the full-grown larva leaves the capsule and enters the ground, where it undergoes its transformation, and comes out the following spring as a moth to repeat the work. Mr. Riley is quoted as saying, "In the more northern portions of the United States and in Europe where Yuccas have been introduced and are cultivated for their showy blossoms, the insect does not exist, and consequently the Yuccas never produced seed there," and suggests that the insect be captured in the chrysalis state and sent to those countries where it is lacking. Three large plants of the Adam's-Needle, or Bear-grass (*Yucca filamentosa*), in our garden near New York, produced fine clusters of capsules this autumn; upon examining them we found that apparently every seed-vessel either contained an insect, or had a hole showing where one had escaped. The capsule of this Yucca consists of three cells, and generally but one of them was inhabited by the larva, which destroyed the seeds in that, while the contents of the other two cells were untouched. All the capsules were one-sided or contorted, owing to the presence of the caterpillar. The fact is an interesting addition to our rapidly-accumulating knowledge of the relations between plants and insects, but it is a question if all Yuccas require this insect aid in order that they may produce seed, or that it is always necessary, even with our commonest species, *Yucca filamentosa*. A very observing friend who made extensive experiments with seedling Yuccas in the hope of obtaining some new varieties, is quite sure that he has obtained crops of seed without any of the distortion of the capsule to which we have referred. A recent *Gardener's Chronicle*, alluding to the statement that Yuccas do not fruit in Europe, cites two cases in which *Y. filamentosa* produced seeds, which would show either that the moth in question is in Europe, that some other insect does the same work, or that the presence of an insect is not always required. During a recent visit to Georgia we found *Yucca gloriosa* in fruit. The fruit of *Y. filamentosa* is a dry capsule, while that of *Y. gloriosa* is pulpy, and when quite ripe is as soft as a banana. We examined a number of fruits of *Y. gloriosa*, and failed to find any distortion, perforation, or other indication that an insect had entered or made its exit. We hope that those who live where this and other species fruit will continue the investigation begun by Dr. Engelmann and Mr. Riley.—*American Agriculturist.*

BIRDS AND WHITE GRUBS.—We find the following signed "H. T." in the *Oneida Circular*:—There is a certain spot on our lawn which is infested with this pest to its great injury. The grubs have completely severed the grass roots, so that the turf loses its color and may be rolled up like a sheep-skin, disclosing quarts of the larvæ. The robins have found out the peculiarities of this spot, and I have often amused myself by watching their operations and observing the manner in which they feed, morning and evening, on the shiny, fat worms. Frequently two or three dozen birds at a time may be seen stalking over the spot, occasionally turning their heads to one side as if listening intently, then suddenly plunging their beaks into the turf and tearing away like mad until they drag forth the grubs, which they then eagerly devour. The robin does not, however appear to be well adapted to this kind of work. The turf being rather tough, he does not always succeed, pull as stoutly as he may. If he fails, he deliberately turns aside and tries another spot. The crow, with his strong, sharp pointed dibble, is much better fitted to be successful in this business of grub catching. When we see him sauntering about in the pastures or meadows in his leisurely way, we must be sure not to disturb him, for he is doing the farmer good service He is such a gluttonous fruit eater that, were it not for this propensity to catch insects, we should regard his presence as an unmitigated misfortune, despite the the sentimental fondness for "robin redbreast" inculcated in our childhood.

Apiary Department.

Dysentery in Bees.

The mortality among bees last winter from dysentery, has led to much investigation upon the subject, by apiarians. At the late meeting of the Michigan Bee-Keepers' Association, Dr. Rohrer, of Indiana, read a paper upon this subject, which contains the following:

"After searching in every quarter for the cause, I find nothing more than has heretofore been common until I came to examine the honey, which last fall presented no external evidence of its unfitness for bees to winter on successfully. But as time progressed a portion of it granulated and left a watery substance which ran out of the cells, and down upon the bottom board, where it soured in many instances. Just what kind of honey it was I am not fully prepared to say, but as there were no flowers from which bees could collect honey last winter in our section, I suppose it to be honey-dew they were collecting, as they came in heavily loaded every day for a week or more; yet I do not take it upon myself to search for this substance in the forests, and may have been mistaken, but don't think I was. After I saw it in the condition above described I almost concluded that it was collected from grapes, but as there was not enough grapes in our part to furnish so much honey, I fell back to honey-dew. I have made inquiry of several persons who claim to be acquainted with this substance, and find them laboring under the impression that bees will not winter well when confined to this material as food. I have also learned that honey-dew last season was quite common in all sections where dysentery prevailed as an epidemic. If this information be correct, I think we have found out the true cause of this disease as it prevailed last winter, and would therefore recommend to bee-keepers the custom of emptying their combs with the extractor in September, and feeding sugar syrup in all cases where it is known that the hive is stored with honey-dew. It will, however, be advisable to make haste slowly by ascertaining as we go along whether or not my conjectures are correct as to honey-dew being unfit for bees to subsist on over winter. A few colonies out of a large number set aside, will be sufficient to test the matter in any large apiary."

Profits of Bee Culture.

It has always surprised us that our people did not pay more attention than they do to the culture of the honey-bee. Considering the amount of capital thus invested and labor expended, it is the most lucrative business in the country.

In this sunny clime where the flowers are brim-full with rich sweets for the larger part of the year, a colony of bees could pay for the hive, the trouble and all expenses the first year, and leave a neat little profit in the owner's hands.

When our people are forced to the conclusion that they must practice economy, and take advantage of all the resources that a beneficient Providence has placed at our disposal, then they will see the wisdom of our advice in this particular.

In order to show what an important item of trade honey is, in certain countries, we adduce the following:—

"The Island of Corsica, paid to Rome an annual tribute of 200,000 pounds of wax, which pre-supposes the production of from two to three million pounds of honey yearly. This island contains 3,790 square miles.

"In the Province of Attica, in Greece, containing forty-five square miles, and 20,000 inhabitants, 20,000 hives are kept, each yielding, on an average, thirty pounds of honey and two pounds of wax.

"According to an official report, there were in Denmark, in 1838, 86,036 colonies of bees. The annual product of honey appears to be about 1,841,000 pounds. In 1855 the export of wax from that country was 118,370 pounds.

"In 1857, the yield of honey and wax in the Empire of Austria, was estimated to be worth over seven millions of dollars."

In the Canton of Thur, in Switzerland, there are 2,123 apiculturists possessing about 10,000 hives—an increase of 3,800 within ten years. The product of an ordinary hive brings about seven francs ($1.40) per year. But the honey of Thur is very much prized by connoisseurs, particularly that of the valley of Arpon.—*Exchange.*

Implements of Husbandry.

The Harrow.

The Harrow is an implement of essential importance in the management of farm-lands. The improvement of its form has of late years received much attention; and various devices have been adopted to render it suitable for a variety of soils and different modes of tillage.

The use of the harrow is to pulverize the soil. This object is but partially accomplished by the plough, which crumbles the soil only so far as may be done by the act of turning it over. The further pulverization caused by the harrow is essential—

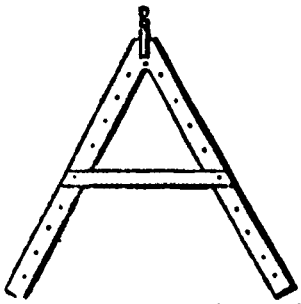
1st. To admit of the ready extension of roots.

2nd. For the free access of air.

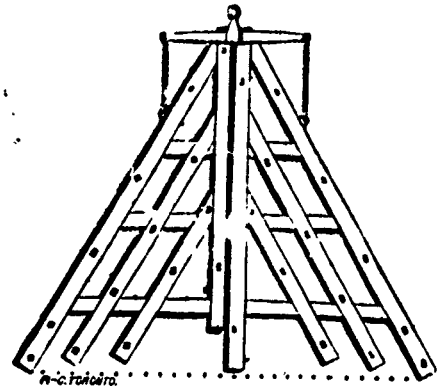
3rd. For the reception and retension of moisture

4th. For the thorough intermixture of manure.

For new, stumpy land, we know of no harrow which is more serviceable or durable than the simplest form of the A harrow, viz: a natural crotch of good sound hardwood with a transverse brace of wood or iron to strengthen it, as in the accompanying cut. It is exceedingly strong, whilst its wedge-like shape enables it to pass any obstruction readily. Any ordinary country blacksmith can make it; all that is necessary being good tough timber of from 4 to 5 inches diameter and from 12 to 20 iron teeth about 1 inch square, and well driven in.



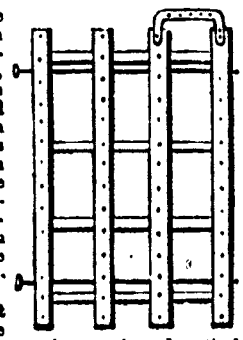
A decided improvement on the above, but intended rather for clear, uneven land, is the "Geddes Harrow" (or modifications of it,) which consists as in the following cut of a central bar, doubled and hinged longitudinally, thus adapting the implement not only to mounds and inequalities, but also to being doubled up for the purpose of carriage. To each side of the centre bar are attached two or more harrow-bars, toothed, each opposite pair meeting in front at an angle, which in some cases though not necessarily, may be increased or diminished by means of iron slides; and the teeth are so arranged that those in any of the hinder bars will mark between those of the bars in front of them. To prevent its rising in the middle the traction chain is fastened not to the central, but to the harrow-bars on each side.



This harrow has usually from 20 to 24 teeth, each from ⅞ to 1 inch square, according to the quality of the ground; and good tough timber of 3 by 4 inches will be found sufficiently strong for the wood part.

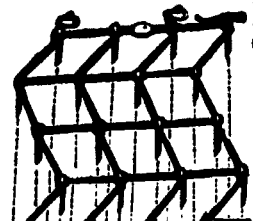
The next form of harrow, viz; the square harrow is familiar to every one, and in its various modifications is, perhaps, on the whole, the best suited for cleared and especially for even land. The general number of teeth in this harrow is about 40, but it may be increased, and by applying the draft so as to give the implement an *echelon* or partially corner-wise movement, each tooth marks out a distinct track of its own, thus affecting a most thorough pulverization.

The most ordinary, and a very effective form of square harrow is made in two sections, each consisting of 4 longitudinal bars of 3 x 3 oak, with 4 transverse bars of the same material 2½ x 1 morticed through them. Two iron rods stretching across each section serve also the purpose of strengthening it, and a continuation of these rods form joints by which the sections are coupled together.

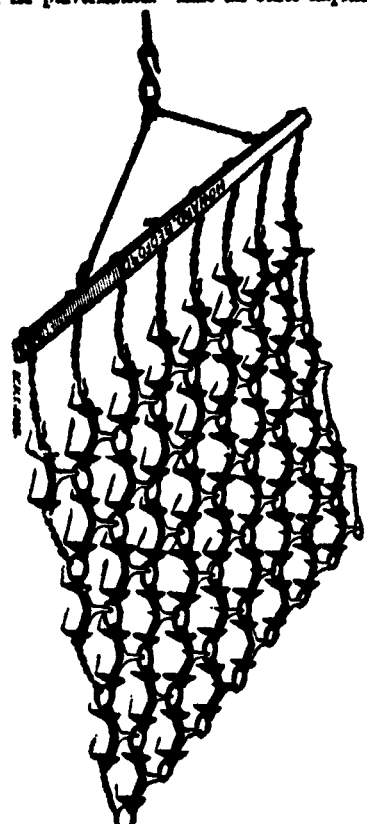


Of course the most durable, although the most expensive form of square harrow, is made entirely of wrought iron:—it being alike invulnerable to the effects of the weather, and proof against splitting under any circumstances, in both of which points it has a decided advantage over the wooden harrow; for, however much it is to be regretted, it is nevertheless a fact that, notwithstanding the amount it costs to stock a farm with proper implements, there are very few Canadian farmers who give their implements proper usage—especially in the way of protection from the weather.

There are many modifications of the iron harrow—the various shapes of the longitudinal bars constituting the main differences—some being shaped somewhat like the letter S; others zig-zag, &c. We have also revolving and other harrows—each of which claims certain special advantages, and may probably merit such claim in some details,—but we have no hesitation in saying that the ordinary square or Scotch harrow, such as we have attempted to describe, when drawn in the *echelon* or corner-wise manner, will fully answer all practical purposes.



The English chain harrow is used more for the purpose of surface-dressing or harrowing in seeds than for pulverization. Like all other implements there are various styles of the chain harrow, perhaps the best of which is that illustrated by the accompanying cut, and spoken of as follows by a recent well-known writer in the *American Agriculturist*:—



"The teeth (of the English flexible harrow) are of chilled iron, fastened together with steel links. It is perfectly flexible, and every tooth is bound to descend until it touches the ground. This makes it the 'a'archin'est' harrow that can be found. The top of every hummock and the bottom of every dead furrow is sure to receive its due share of the scratching. The teeth are longer on one side than the other, and at one edge they are vertical, while at the other they are oblique, so that the harrow may be used, either side up, or either end first. Drawn as it is shown in the cut, it is an effective harrow to follow the plough. Drawn the other side up, and with the draught-bar hooked to the opposite end, it is a fine smoothing harrow, almost equal to a chain mat drawn over the ground. I have found this a good implement for all work, and so much better than anything else I have ever seen for lining manure that has been spread from a cart, or for beating up the manure on a pasture (loosening up the grass at the same time), that I believe its use will add at least ten per cent. to the effect of manure spread and beaten in the ordinary way, simply by causing a more even distribution of the fertilizing matter over the whole surface."

Keep Implements in Thorough Order.

How surprised we should all be if an accurate statement could be made up of the direct loss to the farmers of Canada in one year, arising solely from carelessness in the treatment of farm implements. The sum must be enormous; and the indirect loss still greater. Ploughs and harrows out of order when spring comes suddenly, cause the loss of days of invaluable time for getting in the spring grain. The broken roller causes the land to go without rolling for that season. The disabled seed drill entails broad cast sowing when drilling would have been infinitely preferable. The broken mower or reaper brings work to a stop at a moment when hours wasted mean the loss of ten dollar bills. As a rule, all farm implements and tools should always be in order; the first convenient moment after being broken, the damage should be repaired.

The painting of farm implements, is also a matter of great importance. Every farmer, says the *Register of Rural Affairs*, has several hundred dollars invested in waggons, carts, machines and implements. Now how much longer would these all last if every crack, joint and pore, were always kept well filled with good oil paint? Probably on an average at least one-third longer than if not painted, and more probably at least twice as long. A great deal may be done by keeping them properly housed; but they must necessarily be more or less exposed in use; the heat opens the cracks in summer, a shower often overtakes them and soaks into these cracks. The process is again and again repeated, and decay begins. An overstrain splits them wider, or breaks certain parts. They must be patched or repaired, or new ones purchased. The farmer who has five hundred dollars thus invested might save from fifty to a hundred dollars a year by keeping a pot of paint always on hand, and on an occasional rainy or spare day go over his machines and implements, and fill with paint such as need it. The pot should have a tight cover, so as to prevent the paint drying, which may be best accomplished by using an earthen jar, with a large cork to fit it. Every farmer should keep a vessel of *white lead* paint—the pure article. This is the best for filling in cracks or joints in small tools—it is good for abrasions on the backs of animals, from harness or yokes—it is good for the scratches in horses that have to travel muddy roads—and it is good to paint the mould-board of a plough to prevent rust after ploughing is completed.

Plaster Sowing Machine.

No fertilizer is so desirable, so easily obtained, or so cheap in Canada as plaster. On grass, Indian corn, pea and many other crops, its effects are wonderful. It is, however, disagreeable to sow by hand; and that, we fancy, is one chief reason why its use is not all but universal in Canada. But this objection is completely done away by Seymour's Plaster-Sower, which does the work admirably, and as fast as a horse can walk. This machine is 8 feet wide—can sow all fine fertilizers—has a grass-seeder attached to it—and the quantity sowed per acre is regulated accurately by cog-wheels.

Horticulture.

EDITOR—D. W BEADLE, Corresponding Member of the Royal Horticultural Society, England.

The Kitchen Garden.

Preparation for Planting.

The purpose for which the kitchen garden is intended, is the production of vegetables for the table. Only those vegetables are fit for human food which are tender, fine grained, sweet and succulent. When they are grown in such a way that they are tough, coarse, rank in flavor, or filled with woody fibre, they may be fed to cattle or swine, but should never be found in the kitchen. The instructions we have already given as to the selection of the garden ground, in its exposure to the sun, and its exemption from excess of moisture, and as to the selection of the most suitable soil, have all been given with a view to securing the growth of such vegetables as are suitable for food.

The beds having been laid out and the walks made, the next step will be to prepare the ground for planting. We fear that just at this point the most serious mistakes are made—mistakes that injuriously affect the results for the whole season. It is spring. The season is short. There is a great deal to be done. Work is pressing on every hand, and, in consequence, the preparation of the kitchen garden is not thoroughly done. In the first place, the ground will need to be manured with a liberal hand, for if it be not rich, very rich, the vegetables will grow slowly, and hence be tough and fibrous; and they will grow small, and therefore not possess their natural flavor. But all manures are not suitable for this purpose. The products of the barn-yard need to undergo a course of preparation before they are fit to be applied to the garden. If used in the coarse and crude condition in which they come from the yard, they will induce usually a coarse growth, and impart a rank flavor to the crops.

The first step, then, will be to secure well-prepared and thoroughly-decomposed manure. In order to secure a supply, attention should be given to this matter during the previous summer. The material of the barn-yard should be drawn out to some convenient place, in sufficient quantity to give the whole garden a liberal dressing and thrown into a heap. Adjoining this there should be another heap made up of sods from some old pasture field, or the parings of fence-corners, and, if convenient, the scrapings from some pond-hole in the bush lot. When the manure-heap begins to heat, it should be forked over, thoroughly shaking it out and building it up in a regular form. When the heap that will now be forming is about a foot high, throw over its surface a few inches of the soil, sods and muck from the adjoining pile. In this way, stack up the entire pile in alternate layers of about a foot in thickness of barn-yard manure with a few inches of sods and soil, covering it, when finished, with six or eight inches of the soil. This heap may now remain until spring, when it should be cut down and thoroughly commingled before it is spread over the garden beds. Prepared in this way, the manure will have lost its rank character; the soil will have absorbed the gaseous and liquid portions, and the whole will have become changed into that condition in which it is best adapted to support vegetable life, and impart to it a quick growth combined with a fine texture.

Having provided the material for enriching the garden; we are now ready to work up the soil In small gardens, this will be done with a spade, or better yet, with a digging fork. It enters the ground more easily than a spade, and the soil is pulverized better by striking it with the back of the fork, when turned over, than is possible with the spade. The accompanying cut will acquaint our readers with the form and appearance of the instrument better than any description.

Those who cultivate on a large scale for the supply of public institutions or for market will use the plough. But the work must be thoroughly done. The subsoil should be well broken up by the subsoil plough being made to follow the common plough in the bottom of the furrow, running it as deep as it is possible to make it work. The ground should then be cross-ploughed, still using also the subsoil plough, so that the soil may be deeply and thoroughly broken up.

The Window Garden.

Tea Roses.

Of all the various classes of roses, the tea-scented are the most desirable for house culture. The original tea rose was imported from China in 1812, and its descendants have yearly increased in beauty of coloring and in fragrance, until they out-shine all their beauteous sisterhood, and are, indeed, more beautiful than all others. For the past two years the demand for them has been very great, as no gentleman could attend a party unless a tea rose-bud decorated the button-hole of his coat, and every young lady must either wear them in her hair, or carry them in her hands, and loop her dress with them. So the florists have cultivated them, and no stand of flowers is complete without several varieties of them. They can be purchased in all shades—from the deepest purplish red to yellow and snowy white. They need plenty of sunshine, a very rich compost, and fresh air, to bloom in perfection.

A hot, dry temperature, with stifling air, is not adapted to their needs, and although they will live patiently in it, they cannot flower. They will, however, bud and blossom luxuriantly in a soil of leaf-mould, well decomposed horse manure, and sandy loam equal parts of each, and when the buds are forming, give all the sunshine that can be obtained, but when they are bursting into bloom their beauty will be more permanent if they are set out from the direct rays of the sun. They must be kept well watered, or the buds will blast.

When the flowers have fallen, we must prune thoroughly, if we would have fresh shoots put forth, and new blossoms form. So cut back the branches fully two thirds of their length, keep the roots a little dry, and set the pot away from the glass—not so far that it will receive no sun, but far enough to give it a little rest. In April or May re-pot in fresh compost, and when all danger of frost is past, set the pots into the garden borders, putting cinders or ashes at the bottom of the hole to prevent the roots from striking through.

If you wish to keep the plants solely for winter flowering, it is better to pinch out all the buds as soon as they appear, and this will send all the strength of its root into forming fresh wood.

Roses for winter flowering should always be kept in pots, for you cannot transplant a rose bush that has bloomed during the summer with much hope that it will continue to do so during the winter; but if the plant has been set in the shade, and not received enough water to make it put forth buds, it will produce an abundance of flowers during the winter months This rule also applies to fuchsias, geraniums, etc.

Roses are especially infested with insects; brown, scaly, and red spiders are all fond of them; but if the plants are well showered with water in which carbonate of ammonia and saltpetre have been added, one table spoonful of each to four quarts of water they will soon be routed.—*New England Farmer.*

The Fernery.

Among the inexpensive household adornments requiring little care, and yet affording constant gratification, is the fern case. To the lover of beautiful forms in plant life it is a source of rare enjoyment. The fern case itself is a most appropriate ornament for the parlor, sitting room or conservatory, and from a companionship of two years we are satisfied we should miss the one we have as much as we should miss any household pet—animate or inanimate—our children alone excepted.

Fern cases may be purchased or made. Those for sale at the stores have a bottom of terra-cotta, usually circular in form, with an oval topped glass covering. Our own we had made to our own fancy. It is of black walnut, eighteen inches long, and stands on legs about two inches high. It is one foot in width, and the bottom part—that containing the earth—is seven inches deep. The glass frame for the top is about sixteen inches high, slightly tapering at the top, so that the whole case stands about two feet high. The bottom part is lined with lead, and a half inch hole in the centre allows the superabundant moisture to be let off as necessary. The soil is composed of one part peat or muck, one part sharp sand and one part old, well decomposed barn-yard manure. Care should be taken that the case is not overstocked. We have had some disappointment of this kind, but have come to the conclusion that a case of the above dimensions will support in good health about eight varieties of ferns and lycopodes.

The care of a fern case is very simple. It wants the light, but not the direct sun. Ours sits on a shelf near a south window, but out of the reach of the direct rays of the sun. About once in six weeks remove the top, give the ferns a slight sprinkling of water and about ten minutes air. They are never troubled with dust and will look bright, moist and of a beautiful green throughout the year.—*Maine Farmer.*

Pleasure from Planting Trees.

Captain Basil Hall, while on a visit at Abbotsford, wrote:—"People accustomed to the planting of trees are well aware how grateful the rising generations of the forest are to the hand which thins and prunes them. And it makes one often melancholy to see what a destructive sort of waste and retardation goes on by the neglect of young woods—how much beauty is lost—how much wealth is wantonly thrown away, and what an air of sluttishness is given to scenery which, with a very little trouble, might have adorned and embellished, not to say enriched, many a great estate.

"I never saw this mischievous effect of indolence more conspicuously made manifest than in a part of the grounds here. Sir Walter's property on one side is bounded by a belt of trees, say twenty yards across. The march runs directly along the centre of this belt, so that one-half of the trees belong to his neighbor, the other to him. The moment he came in possession he set about thinning and pruning the trees, and planting a number of hardwood shoots under the shelter of the firs. In a very short time the effect was evident; the trees, heretofore choked up, had run into scraggy stems, and were sadly stunted in growth, but having now room to breath and take exercise, they hence shot up in the course of a few years in a wonderful manner, and have set out branches on all sides, while their trunks have gradually lost the walking-stick or hop-pole aspect which they were forced to assume before, and the beeches, and oaks, and other recent trees are standing up vigorously under the genial influence of their owner's care. Meanwhile the obstinate, indolent, or ignorant possessor of the other half of the belt has done nothing to his woods for many years, and the growth is apparently at a stand in its original ugliness and uselessness. The trees are none of them above half the height of Sir Walter's, and a few, if any, of half the diameter. So very remarkable is the difference, that without the most positive assurances, I could not believe it possible that it could have been brought about by mere care in so short a period as five years. The trees on the one side are quite without value, either to make fences or to sell as supports to the coalpits near Berwick, while Sir Walter already reaps a great profit from the mere thinning out of his plantations. To obtain such results it will be easily understood that much personal attention is necessary, much method, and knowledge of the subject. It happens, however, that in this very attention he finds his chief pleasure—he is a most exact and punctual man of business, and has made it his favorite study to acquire a thorough knowledge of the art.

"His excellent taste in planting has produced a very important effect. In laying out his plantations he was guided partly by a feeling that it was natural and beautiful to follow the 'lie of the ground,' as it is called, and partly by an idea that by leading his young wood along hollows and gentle slopes he would be taking the surest course to give it shelter. But though he had only the prosperity and picturesqueness of the wood in view, he has also, he finds, added to the value of the adjoining fields that remain unplanted. The person who formerly rented one farm came to him and offered to take the unplanted part again, and to pay the same rent for it as he had paid originally for the whole, although one-half of it is now a young forest, and effectually enclosed. On Sir Walter's expressing his surprise at this, the man said that both for growing corn and for the pasture of sheep the land was infinitely improved in value by the protection which his rising woods and numerous enclosures afforded."

ONTARIO FRUIT-GROWERS' ASSOCIATION.

(For the Canada Farmer.)

The winter meeting of this society was attended by members from various parts of the Province, and the proceedings were of a deeply interesting character. Delegates were present from the Western New York Horticultural Society.

Mr. Mooly, delegate from the Western N. Y. Horticultural Society, said that in Niagara county, N. Y., where he resides, fruit is a staple production, and that to secure a ready sale it was carefully selected and nicely packed in the best and cleanest barrels or baskets. It was of considerable importance to get the nicest packages possible, for the first impression made upon buyers was of great importance. As an illustration, a fruit-grower took a quantity of Bartlett pears of prime quality, and packed them in two similar barrels. The fruit in one barrel was carefully wrapped in pink tissue paper, and the barrel lined very neatly with the same; that in the other barrel was carefully handled and nicely packed, but not wrapped in tissue paper, nor the barrel lined with it. The first barrel sold at once for fifteen dollars, the other barely brought five.

A. M. Smith had sometimes, when short of new baskets, sent strawberries to market in baskets that had been used, and consequently stained by the berries but the fruit in these soiled baskets would hardly bring two-thirds of the price that it did when put up in new clean baskets.

Winter Pears, and the best Varieties.

A. Morse had this season kept the Sheldon, White Doyenne and Beurre d'Anjou quite sound up to the present time. He wrapped the pears in paper and laid them on shelves in his cellar, which he keeps as cool as possible without frost.

C. Arnold places the Winter Nelis first as being the most reliable. The Vicar of Winkfield, will sell about as well. The Duc de Bordeaux is a very promising variety, also known by the name of Belle Epine Dumas. The fruit is of full medium size, greenish-yellow when ripe; with a buttery, half-melting, sweet and juicy flesh, of a peculiar flavor. It is usually ripe in December and January. The tree is vigorous and a good bearer.

A. B. Bennett keeps his pears in a cool and somewhat damp cellar. He thinks there is something exceptionally favorable to the keeping of pears this season, as he had never been able to keep autumn pears so long before. He advises that the Beurre d' Aremberg should be picked early

John Grey, Toronto, said that in his vicinity the Winter Nelis and Vicar of Winkfield were good; that in some soils the Beurre d' Aremberg is gritty, while in others it was very fine. The Beurre d' Anjou had not proved to be very good, so far, about Toronto. Easter Beurre is fine, needs rich culture.

W. Saunders, London, had good success with Glout Morceau. In sandy soil the Lawrence had not borne well.

E. Moody had found the Lawrence an abundant bearer and long keeper. The Josephine de Malines is one of the very finest of our winter pears. It is of full medium size, pale, greenish yellow color, and the flesh is stained with a most delicate pink shade, which is juicy, melting, and sweet, with a delightful aroma. It is usually ripe in January and February. Thinks much remains to be learned about gathering and keeping winter pears. Our fruits are usually not picked early enough. When the leaves begin to to fail, all that they can do for the fruit has been done, and then it should be gathered.

A. M. Smith said that at Grimsby, the Lawrence and Vicar of Winkfield did well, but the Beurre d' Aremberg cracked badly, and the trees of the Glout Morceau died with the blight.

The President spoke favorably of the Winter Doyenne. The Noveau Poiteau, keeps and eats well. It is a vigorous grower and an early bearer. The fruit is large, juicy, melting, with a very refreshing flavor. The Lawrence he had found to be a shy bearer, though in the Niagara district it bears well. The Josephine de Malines is one of the very best. The Delices de Hardenpont is beautiful and delicious. The Doyenne du Comice there is none to equal. It keeps well until now, is a fine, pale yellow pear, larger than the White Doyenne.

The Secretary remarked that he had found the Glout Morceau very subject to blight.

Mr. Barnes has two hundred pear trees, and thinks that he has preserved them from blight by placing two shovels full of iron filings around each tree, and by slitting the bark in June the whole length of the trunk, making three or four slits each year in a new place.

Mr. Mills had tried the same experiment and had no blight in his pear trees since.

Application for Trunks of Fruit Trees.

Mr. Chambers had used an application of cow-dung to the trunks of his trees, put on with a stiff brush, and then allowed his sheep to run in the orchard; they did not gnaw the bark, and the codlin moths, which had been very injurious disappeared.

Mr. Barnes used lime, sulphur, and soot made into a mixture with water and applied with a stiff brush or broom.

Mr. Bennett used lime, sulphur and cow-dung, mixed with water and applied with a brush, and found it to keep off mice and lice.

Mr. Arnold used lime and soft soap; sulphur he thought to be too drying and mixed it with a little tobacco water—it was a complete success.

Drying Fruits.

The Secretary stated that he had received a letter calling attention to "Ryder's American Fruit Drier." The contrivance seemed to be very simple. It consisted of a stove set upon its feet in a level place and encased with a four-inch brick wall, but with the front wall brought up tight against the stove, so as to leave the front of the stove, including the stove door, on the outside. Openings are left near the bottom of the brick wall to admit cold air to the air chamber which surrounds the stove within. These openings should be three or four inches square, and below the bottom plate of the stove, say three on each side, and two at each end. The air space between the stove and the brick is from four to six inches. The wall is carried some ten inches higher than the top of the stove at the front, upon this the lower end of the drying box rests, the upper end raised about three feet higher than the lower. The top plate of the stove is covered with a course of brick laid flat and covered with mortar to prevent the fruit from becoming scorched. The wall is then closed up to the drying box and around the stove-pipe, and the heating apparatus is complete. Trays, with slat bottoms, are made to fit nicely into the drying box, these are filled with fresh pared fruit, properly cut for drying, and put in at the lower end over the stove. As each tray is filled it is put in and its predecessor is pushed on up the inclined plane of the drying box. By the time the tray of fruit first put in has reached the top of the inclined drying box it will usually be sufficiently dried. The advantage claimed for the inclined position of the drying box is that the hot air which passes through the trays never again comes in contact with the fruit in the other trays above, but passes on over them, carrying its load of moisture out of the box. This is intended for drying fruit on a large scale. For drying fruit for family use, a very convenient contrivance was exhibited at the meeting of the Western New York Society, consisting merely of a sort of tin oven with openings at the bottom and top, which was made to be clasped around the stove-pipe, and might be used for drying fruit, warming plates, and the like.

By this system a quart of fruit could be reduced in weight to two ounces, and yet when wanted for use could be swelled out to its normal size without loss of flavor or appearance. Fruit dried in this way sells for twice as much as that dried by the old methods. The dried apples sell readily at 18c. per pound, dried tomatoes at 75c., dried raspberries at 45c., and dried sweet corn at 25c.

Messrs Bennett, Martin, and Johnson had dried grapes of Roger's Nos. 3, 4, 9 and 15, so that they were as fine as any raisins.

Filberts grown in Ontario.

Mr. Craddock stated that one of his neighbor's had tried them, but had not succeeded; perhaps the winters were too severe.

Mr. Arnold had found the hazel-nut growing wild very good; the variety known as filberts were as good as those of England, and he had more faith in the improvement of our native varieties than he had in those imported from Europe.

The President had for years raised English filberts here, but thinks they need to be sheltered. Some seasons he had gathered excellent crops, and believed that if properly cultivated and pruned they should do well in this latitude.

Mr. Glass, of Guelph, raises English filberts, and some years they do excellently.

Ashes for Fruit Trees.

Mr. Moody used unleached ashes very liberally, and found the result to be good sound wood and fine fruit. He preferred a bushel of good unleached ashes to a waggon load of barn-yard manure. He used about one hundred bushels to the acre, scattered broad-cast.

Mr. Brooking had found ashes to be just the thing for peaches.

Effect of Fruit-Canning on Price.

Mr. Smith thought that canning establishments were excellent affairs. That at Grimsby had been very successful this past year, even in the American and foreign markets, where Canadian fruits take excellently. There were now some forty acres of berries raised in the township. During the past year had been put up:—7,000 quarts of strawberries at 8c; 4,000 of raspberries at 8c each; 2,000 of Lawton blackberries at 8c; 150 bushels of red cherries at $1 25 to $1 50; 150 of white English cherries at $1 75 to $2 50; 5 of red English at same price; 1 of black currants at 4c to 5c; 50 of pears at $1 50 to $2 50; 90 of plums at $1 25 to $3; no peaches, because they could not compete with the Americans; 75 bushels fall pippins at 50c each; 1,000 lbs grapes at 5c to 7c;—in all 49,000 (30,000 of fruit) two-quart cans of fruits and vegetables, including pie-plant, peas, beans, corn and tomatoes. The demand is growing each year.

The Secretary believed the improved drying processes possess some advantages over the canning, especially for shipping long distances. It is claimed that one pound of the dried tomato is equal to eight quarts of canned, and one pound of dried blackberries or raspberries equal to four quarts of the same fruit canned. If this be correct, the diminished bulk and weight must tell immensely in their favor for long transportations. He believes there is now a good opening in the fruit-producing sections of the Province for these canning and drying establishments, where much more fruit could be grown than is even now produced, if there were a certainty of market for the surplus beyond what was consumed in a fresh state.

New Varities of Apple.

The Secretary explained that it was intended to draw out information concerning certain varieties of apple which had been for some time in cultivation, but were not generally known. He mentioned the Swayzie Pomme Grise as an example; a variety that had been grown by a few persons for perhaps forty years. Norton's Melon, and Early Joe, Wagener, and Benoni apples were varieties of the same character; of the very highest excellence, in his estimation; yet he believed they were not known to one in a hundred of those who raised apples in this Province.

Mr. Moody knew the Norton's Melon and Early Joe. They were fruits of the very best quality; but the trees were poor growers. People like large growing trees. The Primate was another excellent apple of the same habit of growth. Nurserymen cannot sell the trees, and therefore do not grow them.

John Freed thought highly of the Red Quarrenden. The Swayzie Pomme Grise is the best apple growing, and our people ought to learn to prize the quality of such a fruit, and be willing to pay such a price for the trees that the nurserymen can afford to grow and sell them.

Chas. Arnold named the Benoni, a delicious apple, spicy, ripening gradually through a period of five to six weeks, in August and September. The tree is hardy and productive. Grimes' Golden Pippin is a splendid apple. The Moyle is a strange sport or bud variation from the Spitzenburg, and a valuable sort.

W. Saunders referred to a seedling apple grown by Mr. Arnold, his number 4, which he considered a very fine apple, preferring it to the Spitzenburg.

Mr. Barnes spoke of the Hawthornden, as a great cropper.

Mr Beadle admitted it was a great bearer, but thought it very deficient in flavor.

Mr. Arnold thought it not fit to be eaten, it was so wanting in flavor; it would cook well.

Mr. Brooking called attention to the Fallawater. He had found it an excellent market apple, free from the Codlin moth, keeps well until May, and does not rot from a slight bruise.

Mr. Beadle thought the Fallawater an apple of poor quality, and could not recommend it for general cultivation.

Mr. Morse, said one of his neighbors had a tree of the Fallawater, and thought so little of the fruit that he wished to be rid of his tree. He named the Dutch Mignonne as a splendid apple, and the Pownal Spitzenburg, which he thought superior to the Esopus Spitzenburg.

Hybridizers of Fruit.

Mr. Arnold, Paris, referred to the Wilson strawberry as an instance of what had been effected by cross-fertilization, also the Rodgers hybrid grapes, and briefly alluded to his own experiments with fruits and grains, particularly to the unmistakeable evidence of the influence of various pollens upon an ear of corn, which he had made the subject of experiment.

Mr. Saunders gave a short account of his experiments in cross-fertilization.

Adjourned to meet in Chatham at the call of the President.

Fertilizers.

Bone Dust and Super-Phosphates.

Very little progress has yet been made in Canada, in the use of bones and the various fertilizers made from them. This is much to be regretted, as the advantage from their use, can hardly be over-estimated.

It is now about sixty years ago since ground bones were first used by farmers in England as a manure. On the first introduction of this powerful agent the modes of preparing them for the soil were rude in the extreme. They were principally broken by hand with sledge hammers, and applied in large quantities to the land. Subsequently, however, mills were erected and the bones ground and a much finer powder was obtained. In this state bone dust was used at the rate of about eighteen bushels to the acre. It remained, however, to Baron Liebig to discover the now popular method of preparing them by dissolving bones in sulphuric acid; and it is found by actual experiment that one bushel of bones treated with one-third its weight of acid is fully equal to four bushels of the dust. Nor is this the only advantage gained. Turnips, for which these dissolved bones are chiefly used, reach the growth to which they attain, when thinned, from fifteen to twenty days sooner than when either simple bone dust or barn-yard manure is employed, thus defeating the ravages of that terrible pest so ruinous to this crop, the turnip beetle. Super-phosphate is eminently the manure for this climate, and especially for this crop, because, although guano is found to be equally good in humid or moist climates, it does not act near so quickly during dry weather.

In Canada, however, it is not necessary for us to depend entirely on the bones furnished by dead animals. Providence, in this instance, as well as in many others, has highly favored us. The phosphoric deposits in many parts of our country promises to be mines of untold wealth. These deposits are supposed to have been caused by the fossil remains of ante-diluvian and pre-historic animals, and are of vast extent.

There is, however, another substance very commonly found in most parts of Canada which looks like water-worn stones, but which is known by the name of *Coprolites*. They obtained this name because it was supposed they were the fossil excrements of animals; this has since been proved incorrect, but the name still sticks to them. A valuable article is manufactured from this fertilizer in England called "Lawes' Super-Phosphate," and, no doubt, some day, their value will be recognized in Canada; as, however, they are the hardest substance from which manures are manufactured, they require very powerful machinery to crush them. After passing through the mill they should be treated with sulphuric acid in a similar way to bones.

There are several methods of preparing bones. If bone dust be mixed with its own bulk of earth, and is thoroughly wetted with the liquid manure that leaches from the farm-yard, violent fermentation will set in, dissolving the bones thoroughly and making a valuable nourishment for the turnip crop, but not equal to bones dissolved in acid.

Another way of proceeding, after procuring the desired quantity of bone dust and sulphuric acid, is to construct a wooden trough, say 7 feet long by 2 feet wide and 2 feet high, made of 2 inch plank, perfectly tight and put together with wooden pegs as the acid soon uses up iron nails. The bones should then be sifted to take out about a third of the finest particles for drying, for 48 bushels of bones 3 carboys of acid of 180 lbs. each will be required. The carboys are then emptied into the trough and a quantity of water equal to 4½ carboys mixed with it. Two men will then rapidly shovel the bones into the trough. So soon as the bones have dried up the acid in the trough it is as well to re-mix with a shovel; then cover with a couple of inches of the small meal previously sifted out, and let the mixture remain for two days in the trough. On emptying the mixture out it will be found to be in the state of a dark paste, and should be mixed with the fine siftings. After the mass has been turned several times at intervals of a week, it will be found quite dry enough to sow by hand or drilled in with a machine. None but the oldest clothes and shoes should be worn during the first process of mixing the bones and acid; practically, however, the water should be put in the trough before the acid.

Another and a simpler method of preparing dissolved bones is by passing the bone dust through a wheat-sieve and throwing the powder into an iron vessel with half its weight of sulphuric acid, and the same quantity of water. After standing for a day it may be transferred to a wooden vessel and more water added, and then allowed to macerate until all the larger pieces of bone are soft. The mixture can either be diluted with water and applied to the land from a water cart, or mixed with mould and sown over the land in the state of super-phosphate of lime. When thus applied, it should be put in along with the seed. It answers well in this way for pastures and its effects are instantaneous.

Manure the Basis of Success.

The business of the farmer is to feed and clothe the human family—"to make two blades of grass grow where only one grew before." If the farmer wishes to make a good crop of hay, he must manure his land thoroughly. Two to three tons of timothy hay per acre is a good crop. If the farmer wishes to make a good crop of corn, he must manure his land well. Good land, well cultivated, in good seasons, ought to make from forty to one hundred and thirty bushels of corn to the acre. If the farmer wishes to make twenty, thirty, forty bushels of wheat to the acre, he must have his land in good condition. Large crops of wheat are not grown on poor, badly-cultivated land. If the farmer wishes to make large crops of potatoes, sweet or Irish, or fine cabbage or turnips, he must make his land rich. The first, most pressing, most indispensable want of the farmer is manure. If the farmer can make or buy plenty of good manure, he can have fine crops. Farming without manure is a discouraging, profitless avocation.

To make manure, then, is the leading idea of a farmer's life. All farm stock, horses, beef, cattle, hogs, sheep, should be stabled or enclosed (certainly at night) in yards well littered with straw or weeds. Every animal, all poultry, should contribute its quota to the manure bank. All weeds, litter, loose dirt, should be placed on the manure bank. Wet straw, wet cornstalks, &c., is not manure. Manure is a compost—is vegetable matter animalized by well-fed animals. Every horse and cow ought to manufacture manure. Swine and sheep make the best of manure. Hen manure is probably the richest of all manure, containing 8.4 per cent. of ammonia.

But in addition to the manure from the barn-yard and hog-pen and poultry-house, the farmer should sow clover freely, let it attain its full growth, and see that one crop at least is left on the soil. Some farmers use lime, others buy ground bones, others buy phosphates, the various alkalies, &c. All are good, if properly made and properly used. But if the farmer wants good crops, his land must be well manured—rich.

I live in a limestone region, and because we see here and there numerous limestone rocks projecting above the surface, some of our best farmers have supposed that there must be lime enough in the soil. This is a mistake. I have burned and used some six thousand bushels of lime, at a cost of ten cents per bushel, which I have applied to some 60 acres, one hundred bushels per acre—and my impression is, that barn-yard manure, clover, and all fertilizers act with greater power on soils after they have been limed. Lime is used in Europe with decided advantage. Lime should be used on grass fields that are not to be ploughed for a year or more, or on fields, after ploughing, designed for wheat or corn. Lime would be especially advantageous in all sandy soils with clay subsoils.

Clover is a valuable fertilizer—it is easily managed, cheap—furnishes fine grazing. It is said that there are three tons of clover roots, per acre, on a well-set field. Bones are in a high degree valuable as fertilizers. I saw it stated, some time ago, that a farmer applied 600 lbs. pure ground bones, per acre, and gathered six bushels of clover-seed from it, in one crop of his rotation - T MADISON, *in American Farmer.*

Sow Plaster.

Let no farmer who wishes to raise a luxuriant crop of clover on his thin soils fail to buy a few barrels of land plaster, and sow on it just as it begins to show on the ground, and before the hot days set in. The beneficial action of plaster on clover is due chiefly to the capacity or quality which the plaster has of fixing the ammonia brought down from the atmosphere by the rains, dews, snows, and thus securing a large supply of nitrogenous food for the growth of clover. If any farmer doubts that he will be compensated for this outlay, let him buy but a bushel of plaster and sow one slip across his field, and he will find the clover so rank as to look like a raised bed, or parterre of living green.

A Wisconsin farmer states that he sowed plaster on a field May 20, and obtained three times the grass on this field more than on that where it was not sowed. He used to raise only one ton of hay per acre; now raised, by plaster, two or three tons per acre; always top-dressed it on grass lands. He also states that when plaster was sown on clover, the clover all cut and hauled off, and the ground broken and sowed to oats, every cast of the plaster made in sowing it could be plainly seen in the field of oats. Also that when plaster was applied to corn, in the hill, the place of every hill could be seen in a crop of wheat which followed. In a drought, dew would be found on the ground where plaster has been sown, while all other ground was dry and hard.

Making Manure.

A New Jersey correspondent of the New York *Tribune* gives his plan for making manure, which shows that he knows how. To carry it into practice I have a place for the manure heap convenient to the stable; clean the stalls every morning, or when necessary, and throw on the heap; always keep it well together, with a flat and broad top; it will soon commence to rot, and by the time there are eight or ten loads accumulated take a day and haul to some suitable place for manufacture. As the manure is hauled keep it well together, and not less than three feet deep; keep the top always flat or a little concave, as in this way the valuable quality is better retained. When manure is heaped conically or spread carelessly far around, and remains so for any length of time, its value then would only be about equal to straw. The heap should be regulated in depth according to quantity. By hauling a day at intervals in winter the yard may be clear by the time of turning stock out to pasture. When the pressing work of Spring is past, turn the manure-heap over, mixing it thoroughly. It should be finished square or oblong, with straight and nearly perpendicular sides, well packed all through, and not less than four feet deep, as the deeper it is the better; finish the top about level, with six or eight inches of soil, which will prove valuable in saving the good qualities of the manure. When application time comes there will be found a rich heap of manure, black and greasy.

Bone-Dust.

An intelligent English farmer, writing to *The Mark Lane Express*, states his experience with bone-dust and super-phosphate made from bones. He believes bone to be the "cream of the cream" as manure. On pasture land, in Cheshire, where he lived seven years, he found it indispensible. In Wiltshire he found it developed the best grasses and produced a superior herbage; it produced the best roots, and on the wheat crop, in the shape of super-phosphate, it secured a good stand. He used $2,500 worth of it, and believes it to be the best worth a farmer's attention of any outside manure. He found on clay lands impregnated with oxide of iron that until the land had been limed the bone had no effect, but so soon as lime was applied bone was used with success. Finally on experimenting with it on sandy soil he found it perfectly useless, and even in quantities of 700 lbs. per acre applied to old pastures or young grass lands it had no perceptible effect during many years.

THE CANADA FARMER

IS PUBLISHED

ON THE 15th AND 30th OF EACH MONTH,

AT

One Dollar and Fifty Cents Per Annum,

FREE OF POSTAGE.

It is sent to Great Britain and Ireland by mail, for six shillings sterling, *per annum*.

No subscription received for a less term than one year, commencing from the month of January

THE CANADA FARMER is stereotyped so that copies can always be had of back numbers

A limited number of advertisements are inserted at twenty cents per line for each insertion There are eleven lines in one inch of space. Advertisements under ten lines are charged as ten line advertisements.

All letters and money orders are addressed to

THE GLOBE PRINTING CO,
TORONTO.

☞ Agents wanted in every town and village in the Dominion to canvass for subscribers Liberal commission allowed. Send for circular stating terms.

The Canada Farmer.

TORONTO, CANADA, FEBRUARY 28, 1873.

It was well on in January before the new series of THE CANADA FARMER was determined upon—and the editorial and mechanical arrangements for its publication occupied some further time. The first numbers have in consequence, appeared behind time; we shall presently make up the lost space, and appear punctually on our stated days of publication.

ENTOMOLOGICAL SPECIMENS may be sent for identification or for information respecting history and habits, to the office of the CANADA FARMER, or direct to the entomological editor, Rev. C. J. S. Bethune, Port Hope, Ontario The postage should be pre-paid. The specimens should be sent in a pasteboard or other box, not loose, but packed with cotton wool, or some similar material. Grubs or caterpillars should have plenty of leaves, and not cotton wool sent with them. The name and address of the sender should also accompany the package, not necessarily for publication, but as an evidence of good faith, and that we may know where to apply for further information, if required.

Farmers' Clubs.

It is a matter of infinite regret that we have so few of these valuable organizations established throughout Canada. There are sections in every part of the Dominion, where first-class farmers are numerous, and capable of throwing a vast amount of valuable light upon the practice of agriculture. Yet, from some cause or other, they have never heartily taken up the plan of holding stated periodical discussions on questions affecting their common interests. This is much to be regretted. On the young men, especially amongst our intelligent agriculturists, we earnestly urge that they take prompt steps, in the absence of any such organization in their neighborhood, to establish and maintain a Farmers' Club, for the holding of stated meetings to discuss practical questions, state their experience of the members; make suggestions, obtain hints, and arrange for concurrent experiments.

It is predicted that in five years, at the present rate of consumption, the Maine forests will be cleared of merchantable timber. The quantity cut in 1872 was seven hundred millions of feet—of which 225 millions came from the Penobscot forests, and 100 millions from the Kennebec district.

Experiments with Fertilizers.

At the eastern experimental farm, of Pennsylvania, a series of interesting experiments have been made for five years past, as to the effects of various fertilizers on various crops, in comparison with the same crops on the same land without the use of any fertilizer A statement of the results has been given to the public through the columns of the Germantown *Telegraph*, which will be highly acceptable to agriculturists everywhere.

The statement of Mr. Carter does not disclose the kinds of fertilizers applied to the several crops. It was thought more advisable to state only the cost per acre of the fertilizers used; and the crop obtained from that expenditure in contrast with the crop obtained without any expenditure

Ten plots of each crop, if we understand correctly, were tested with different fertilizers. The *average* cost per acre of the ten kinds is given—and the average yield, the highest yield, and the lowest yield per acre.

With these explanations, let us see the results:—

Effects on Grass.

In 1868, the average cost of the fertilizers used was $9.37 per acre. The weight of hay obtained without any fertilizers, was 3,648 lbs. per acre. With fertilizers, the lowest weight was 3,608 lbs., the average was 4,301 lbs.; and the highest was 4,784 lbs. per acre.

In 1869, the average cost of fertilizers per acre, was $8; without any fertilizers, the weight of hay was 2,400 lbs.; and with fertilizers, the lowest was 1,904 lbs.; the average was 2,772 lbs.; and the highest was 3,360 lbs.

In 1870, the cost of fertilizers was $8 per acre; without any fertilizers, the weight was 5,568 lbs; and with them, the lowest weight was 5,712 lbs.; the average 5,984 lbs., and the highest 6,336 lbs.

In 1871, the cost of fertilizers was $8 per acre; the weight of the crop, without them, was 3,040 lbs.; and with them, the lowest was 3,136 lbs.; the average 3,704 lbs., and the highest 4,128 lbs.

In 1872, the cost of fertilizers was $12.50 per acre; the weight of the crop without them was 1,232 lbs.; and with them, the lowest was 1,168 lbs.; the average 2,912 lbs, and the highest 4,048 lbs.

In 1872, a special experiment was made to test the effects of lime in different quantities on grass with the following results:—

No Lime	3,840 lbs.
50 bush. Lime, per acre	4,080 "
100 " " "	4,416 "
200 " " "	4,064 "

Effects on Oats.

In 1868, the cost of fertilizers was $16 per acre—the crop without them was 12 bushels—and with them the lowest, the average, and the highest were all put about 16 bushels per acre.

In 1869, the cost of fertilizers was $16 per acre—the crop without them was 57—and with them 44½ bushels per acre.

In 1870, the cost of fertilizers was $10 per acre—the crop without them was 43—and with them from 48 to 54 bushels per acre.

Effects on Wheat.

In 1869, the cost of fertilizers was $25 per acre—the crop without them, was 18½ bushels—and with them the lowest was 17½, the average 24, and the highest 29 bushels per acre.

In 1870, the cost of fertilizers was $13.50 per acre—the crop without them, was 8 bushels—and with them, the lowest was 7, the average 9, and the highest 11 bushels per acre.

In 1871, the cost of fertilizers was $12.50 per acre—the crop without them was 13½ bushels—and with them the lowest was 15½, the average 22½, and the highest 31½ bushels per acre.

In 1872, the cost of fertilizers was $10 per acre—the crop without them was 16½ bushels—and with them the lowest was 15¾, the average 20½, and the highest 26¼ bushels per acre.

Effects on Corn.

In 1868, the results were fertilizers 8—without them 71 bushels—and with them the lowest 72½, the average 74, and the highest 76 bushels per acre.

In 1870, fertilizers $10—crop without them 44 bushels—and with them lowest 46½, average 52, and highest 62 bushels per acre.

It will be interesting to know the kind and weight of the several manures applied, as Mr. Carter frankly confesses that among them were "many notorious humbugs which of course reduced the averages."

Quarter-evil.

A correspondent (Mr. A. D. McConnell) writes us from Port Burwell, that his cattle have been attacked by a disease which first shows itself by lameness in the leg and causes death in twenty-four hours. He has already lost four young beasts, and when he opened the carcases he found a great deal of blood and water settled in the parts affected.

We suspect the disease which has proved so fatal amongst your young cattle is what is generally known as black quarter, also called quarter-evil or black-leg, a congestive fever. It is a disease of an anthrax character, and must be regarded as a disease of the blood, resulting from an altered condition of that important fluid, whereby its natural elements are greatly changed. As far as we have had an opportunity of judging, quarter-evil is not a very common disease amongst the cattle of this country. In some parts of Britain, however, and on the continent of Europe hundreds of young animals are yearly lost from this disease, which has been found to result from various causes, as rough coarse herbage common to wet soils, or from the use of very stimulating and nourishing food in large quantities, this is especially the case in young animals that are closely kept penned up in small places, and allowed little or no exercise, the supply of nutritive material to the blood is much greater than the waste of the tissues, and disease is the result Exposure and an insufficient supply of pure water may also produce the change in the blood that will excite the disease.

Quarter-evil is a disease that runs its course with alarming rapidity after the development of the first symptoms. Usually the first symptoms observed are lameness either in a fore or hind limb, great dullness, and a quick pulse, and these symptoms are speedily followed by those of great nervous debility, it is with the utmost difficulty the animal can move around, and will stagger and fall helpless to the ground. The mouth is unnaturally hot, for a short time, but as the disease advances it becomes cold, the eyes are reddened, and a swelling of the affected limb ensues. If the swelling is pressed a crackling noise is emitted, which is due to an emphysematous state of the subcutaneous areolar tissue, resulting from decomposition of the tissues.

The disease is not always confined to the limbs, in fact any part of the body may become affected, but it generally affects those textures which are loose and soft, and where the blood-vessels are not very firmly supported. As death approaches the swellings increase, the pulse is quick and weak, and the extremeties exceedingly cold.

Post-mortem appearances.—When the skin is removed, the blood-vessels immediately under the skin appear full, and from the parts immediately affected there issues a dark-colored and bloody discharge, and if the tissues are cut into they show a gangrenous condition, the belly is distended, and a dark frothy discharge comes from the nose and mouth. Quarter-evil is most common in young animals from six months to three years old, and is seldom met with in milking cows. It is a disease that runs its course so rapidly that treatment in many cases proves of very little avail, but a very great deal can be done in the way

of provention. Whenever the disease is suspected amongst a number of young cattle, they should be given a complete change of food for a short time, and if in high condition, a purgative should be given, as half a pound to a pound of epsom salts, according to the size and age of an animal.

Linseed meal or oil-cake given daily and in small quantities has been found to be of very great service in improving and regulating the state of the system.

We would also recommend the use of the *hyposulphite of soda* in half-ounce doses, every second day, until five doses are given.

Care should be taken that the supply of water is pure and regular, and all young animals should be allowed a certain amount of exercise daily.

Quarter-evil is not a contageous disease, the same cause that produces the disease in one animal may operate in many.

Williamson's Steam-Plough.

We find in the *Maryland Farmer* the following account of a traction engine for ploughing and other work which is said to be an improvement on existing machines. It is from the pen of Mr. Wilkinson, of Baltimore :—

"The engine is thirteen feet in length, six and three fourths feet in width, the boiler and smoke-stack standing only ten feet from the ground. It carries two hours' supply of water and four hours' supply of coal, and requires about five tons per day of the former and three-quarters of a ton of bituminous coal.

"Though the day was propitious, fallow and stubble ground were entirely too wet for tillage, rain having fallen in torrents the day previous; but our host seemed determined that we should not be disappointed in seeing the *steam plough* perform, so he ordered it into a long standing pasture, with a very firm sward. The lot was rather short, measuring only two hundred and fifty yards in the direction of the axis of the furrows. The engine turned on the headland on each side of the lot, and set in again without stopping only losing at the ends, perhaps, thirty seconds of time. It is supported on three wheels, two (the drivers) sustaining nearly the entire weight of the engine—the third and smaller wheel being affixed in front, and used for steering, as is the front wheel of a velocipede. The driving wheels are fifty eight inches in height and sixteen inches "face," the steering wheel thirty four inches in height and thirteen inches face.

"The ploughing apparatus consists of a frame with a gang of five to eight ploughs attached, each so arranged or set as to cast its furrow into that of the plough preceding it. The width of the belt of sward, the ploughing of which I witnessed, was about six feet, and seven to eight inches in depth though the engine was evidently capable of ploughing a much greater width and depth as it has ploughed at Bloomsdale seven feet in width and ten inches in depth. The speed with which the plough advanced was about double, and perhaps more than twice that usually made by mules and horses in ploughing. The soil was nearly free from stone and rocks, and it was thoroughly ploughed.

"Prior to the exhibition of the engine in ploughing, the engineer plied it several times up and down a farm lane, and ran it up among buildings, where the turns must necessarily be short, and made with precision. He also exhibited various velocipedian performances with admirable skill, and satisfied all that the ponderous iron horse could turn much quicker, and on a less area, than would be required to turn a pair of horses attached to a farm waggon; or to be more explicit, it can be turned completely around in a circle of eighteen feet diameter, as either of the driving wheels can be made to serve as a pivot. Two large farm waggons were attached behind the steamer, each fitted up with loose seat boards across the beds, and as many as could ride were seated, when she steamed out on to the public road, passing obstructions and avoiding gate posts in admirable style. We sped away a circuit of some two or three miles, and returned to the starting point by entering the domain on the opposite side from that at which we left it, and crossed by farm roads through an area of fifty acres or more, which had recently been ploughed by the engine. The work appeared to have been executed in a superior manner, and to a uniform depth of nine inches."—*Mass Ploughman.*

Curing Rennet.

Would you please describe in THE CANADA FARMER the best mode of curing rennet.—M. G.

Reply.—Cheese consists of the caseine of milk, separated and condensed. To effect this separation, coagulation, or "curdling," must take place, and nothing has hitherto been found to accomplish this so perfectly as the prepared stomach of the calf. The several steps are as follows: The stomachs, fresh from the hands of the butcher, are cleaned and salted; and then closely packed in a deep earthern vessel. In this state they should lie for several months. A few weeks previous to use, they are taken out, and drained of all brine; then spread out, sprinkled with salt, and dried. A couple of pieces, say four or five square inches, of these are steeped in a pint of warm water, in which has been dissolved half a tablespoonful of salt. Let this stand over night, and the result will be a quantity of rennet sufficient for one hundred gallons of milk.

Another method, on a larger scale, is to procure a large jar, the larger the better, in the bottom of which, carefully drill a three-quarter or half inch hole. In this hole fit a stout wooden tap, to be used in draining off the liquid. Next make a brine strong enough to bear an egg Boil half an hour, and when quite cold, pour into the jar, adding for every two gallons of the liquor, six veils, or prepared stomachs, a sliced lemon, and an ounce of saltpetre, other well flavored spices may be added at pleasure, as they tend to keep the rennet in good condition. This should be prepared three or four months before using. Great care should be taken in all cases that the veils are sound and sweet, and that the salt used is of the first quality Rennet thus made will coagulate 1,800 times its weight in milk.

Profits of Hop-growing.

At the recent meeting of the New York Dairymen's Association, Mr. J. V. Scoville drew the following tempting picture of hop-growing in connection with dairying:—

Said a hop-grower to me the other day: "The present high prices of hops has turned our farmers crazy." But let me suggest an old adage: "Think twice before you leap." Don't embark in hop-growing until you have firmly resolved to continue the business for a series of years, though sunshine and shadows. It's a perplexing business, but we are willing to endure almost anything to make money. It necessitates a large expense at the very outset. The usual system of planting makes 700 hills to an acre, which require, to be properly poled, 1,400 poles. Good selected Canada poles could scarcely be delivered on the ground for less than twenty cents, or at a cost of $280 per acre, and I know of many a yard where such poles have cost twenty-four cents apiece.

A good drying-house with the proper equipments, could scarcely cost less than $1,000 at present, and then, with your hop-yard planted the previous year, you are ready to realize, provided your crop is not blasted and the brewery men are willing to give you remunerative prices. I am unable to present the actual cost of cultivating an acre of hops, as the conditions of the ground vary so much, but I have often heard reliable men say that they would as soon take care of an acre of hops as an acre of corn. But I can give you some idea of the cost of harvesting, by presenting the result of a single day's picking in my own yard. The names of thirty-six pickers appear on my list, though the actual number was scarcely less than sixty, including large and small. The older ones picked in the regular boxes, and the younger ones in straw hats and baskets. Some families picked as high as seven and eight boxes, and the amount per box paid to those who boarded themselves was 45 cents, and those who boarded 30 cents. The following table presents the matter in detail:

Number of boxes	92½
Amount of hops dried	1,135 lbs.
Average weight per box	12¼ lbs.
Paid pickers in lots	$45 63
Paid pole-pullers	11 00
Paid for boarding pickers	12 50
Paid for 33¾ lbs. sacking, included in weight of hops above	4 05
Paid for drying 1,135 lbs. of hops at 2 cents	22 70
Total	$96 43

No allowance is made for individual time or labor This makes the cost of harvesting alone 8½ cents per pound, or $85 per thousand pounds, equal to $170 per ton. Hops are a good paying crop at twenty cents a pound, but when we get fifty or sixty cents, as is sometimes the case, then we get a glimpse of the "golden fleece." From six to seven acres of hops the grower not unfrequently receives $4,000 or $5,000.

Steam Mower and Reaper.

It has long been a matter of interesting speculation with intelligent agriculturists whether steam could not be applied to the driving of reaping and mowing machines—and at last a promising movement has been made in this direction. Mr. Edward Hayes, of London, England, is the party who has undertaken to solve the difficulty. He has constructed a machine which consists of a boiler and steam engine, erected on a light wrought-iron girder frame, the whole being carried on four light wheels of which the two hind wheels are utilized for propulsion and the two fore wheels for steerage, and for carrying the cutting apparatus from off the ground. The boiler and engine are specially designed to develop a maximum of power with a minimum of weight; and the steam is used at a pressure of one hundred and twenty pounds to the square inch in the boiler. The piston speed is high, and is applied by suitable intervening mechanism to the double motions of actuating the cutter-bar and propelling the implement by means of the driving wheels. With the object of not overloading the frame and machine, the storage room for fuel and water is very limited, and arrangements must be made for supplying the tender with these requisites at suitable localities. The machine is worked by two hands, a man to steer and a boy to attend the fire—and the weight of the whole affair is said not to exceed that of an ordinary combined mower and reaper.

If this machine proves practically successful it will be an immense advantage to the farming interest. Among other good results from it, would be the setting free of the farm horses for cultivating and drawing at a moment when their services are urgently wanted for these purposes.

Indian Corn and Cut-Worms.

"Every corn raiser is painfully aware of the destruction often done to his crop by the cut-worm and would gladly find an efficient preventive of their ravages. Well here is one suggested by a correspondent of the *Country Gentlemen* :—

Immediately after the corn is planted, sprinkle on the hill, over the covered grains, about one tablespoonful of salt to each hill. More will do no harm, but how much more the corn would stand I do not know. A tablespoonful is enough, and perhaps less would do. That is all. I have buried cut-worms in salt and left them there a long time without doing them any apparent harm, and they will crawl over salt without hesitation or any seeming annoyance, but they will not eat the young corn plants if there is a little salt in its sap. That seems to be the explanation of its protective influence.

Allow me to repeat that the salt should be put on the corn hills immediately after the planting, that it may be dissolved by the rain, dew, or other moisture in the air, and thus reach the roots of the plant greatly diluted by mixture with the soil, and therefore safe to the young and tender plant; and also that it may be at the roots, where it may enter the sap of the plant, not at the leaves, where it can only destroy."

This is a very simple remedy, easily tested, and the salt will help the crop, even should it fail to foil the cut-worm.

PLANTS IN SLEEPING ROOMS.—Sad consequences have followed from sleeping in close apartments in which potted plants were kept. Very many in warm family rooms, not very frequently ventilated, may seriously injure persons of a delicate organization—especially those predisposed to pulmonary affections or bronchial irritability. All vegetables throw off oxygen—an element that supports life through the day, but that function is suspended through the night While exhaling oxygen from one side of a leaf, the other imbibes carbonic acid gas—which is prejudicial to life, and the solid part of stalk, stem and wood are formed from it, but while sleeping, as the whole vegetable kingdom does, through the night, the absorption of that deleterious gas is partially suspended, though it collects about them by virtue of a law not very well understood. It is that accumulation in a room, the inhalation of which into human lungs is so injurious. Therefore it is always on the safe side not to keep flowering or any other pot plants, either in dormitories or close family drawing rooms.

Vitality of Wheat.

A correspondent of the *Germantown Telegraph* asserts, giving details, that a smoke-house was built in eastern Pennsylvania in 1790; that during the past season, in repairing the building, a head of wheat was found embedded in the cap of the gable; that five of the grains thus found were planted, and four of them grew "in bare ground," after having been embedded in mortar 82 years

New Breed of Sheep.

Some years ago France received great benefit from the introduction of merino sheep, and an experiment of acclimation of a similar nature is about to be made at the park of La Tete d'Or, at Lyons, from which are expected results equally advantageous There are now daily expected at the menagerie of Lyons several specimens of a breed of sheep hitherto unknown in Europe. They give almost as much milk as goats, and produce in addition as much wool as the merinos, and they are claimed to furnish as good meat as any now in use This rare breed of sheep is to be found only in some of the Cantons of Algeria.

Cows in the United States.

The last census showed that there were 10,303,500 cows in the United States, which were valued at $29,408,983. Most of these were of a very inferior kind. The average yield of milk, in the North-West, was only 2,530 lbs. per cow, but a dairyman in New York has succeeded in getting a yield of almost 8,000 lbs. per cow from a herd Mr Fish, of Herkimer Co., N. Y., by judicious selections, obtained a herd of cows that averaged 834 lbs. of cheese per cow, each year. The cow "Red Rose," gave 2,956 lbs of milk, from Aug. 1st to Sept. 15th, and one day gave 76 lbs An Ayrshire cow, "Lass," gave in the same time, 2,746 lbs. and bred till she was 19 years old. The cow, "Nettie," gave 1564 lbs. in July, an average of 44 lbs. daily. The cow, "Beauty," belonging to E. T. Miles, of Mass., gave, in 1870, 9,011 lbs of milk; in 1871, 7,922 lbs.; in 1872, 7,555 lbs At the last date she was 11 years old, and weighed 985 lbs.

Two or Four Rowed Barley.

The *Rural Home* calls the attention of farmers to the comparative advantages of two-rowed or four-rowed barley intended for the American market It alleges that from ten to fifteen cents more is paid for the four-rowed than for the two-rowed in the United States. Maltsers, it is said, prefer the four-rowed because it is better adapted to making light ales, and especially lager-beer, than the four-rowed. It gives a brighter and clearer color to the liquor than does the two-rowed barley, and this quality is highly essential, in making lager especially.

For making heavy or dark colored ales the two-rowed is better. In the United States, light ales and lager are far more popular and are consumed more extensively than heavy and dark ales—hence there is greater demand for the variety of barley which will best produce them.

Planting Timber.

Dr. John A. Warder at the Ohio Agricultural Convention, offered five resolutions, the gist of which are contained below:—

The first recommends farmers to plant their hill-sides, ravines, and broken lands with timber; the second advises that at least one-tenth of every farm be devoted to groves and shelter-belts; the third urges the legislature to encourage, by suitable enactments, the planting of artificial forests and the setting of useful and ornamental trees along highways and railroads; the fourth asks local and other societies to aid in this matter by the offer of suitable premiums; and the fifth urges the propriety of the managers of the agricultural colleges giving "especial attention, as far as may be practicable, to the planting of an arboretum for the production of every tree that can be grown on the college farm, to be so devised that each kind may develop its native character, and also to the planting of an artificial forest of useful trees so arranged that it may afford the most valuable instruction to those in attendance and to visitors."

Rustic Boxes.

These can be made from hollow tree trunks, taking care to retain the bark, and when spring comes be filled with rich earth. After warm weather has set in, and all danger of night frosts is over, these boxes may be planted with blotched Petunias, Verbenas, Lantanas, Heliotropes and the like, and set in suitable places around the yard. They should not be placed where they will receive the drip of overhanging trees. A very pleasing effect may be produced by combining with these flowers some of those plants which have crimson, purple, or variegated leaves.

European Agriculture.

(*From Bell's Weekly Messenger Feb. 24.*)

The agricultural intelligence which comes to hand from the French departments is generally favorable, snow and frost having exercised a happy effect on vegetation rather than otherwise. The markets are not over supplied; and, notwithstanding the quiet tone of affairs, prices remain well supported, especially in the departments of the east and the south of France. At Marseilles transactions have not been very extensive, stocks having become much reduced; but prices have strengthened, and have even experienced a slight advance. Switzerland and South Germany have continued to make purchases, and the milling trade has again been purchasing, in consequence of the scarcity of the article which it has to work up. At Bordeaux and Nantes, farmers, without expressing serious apprehensions on the condition of the growing crops, show themselves very reserved, and only make extremely moderate purchases. In Germany, the grain markets have been quiet, but prices have not exhibited any serious fall. In Holland, the tone of the grain trade has not varied. In Italy prices have exhibited a hardening tendency.

The Hop Trade.

The price of hops is at present highly remunerative, and if the statements of a great American hop-buying firm are to be relied on, the demand for hops is likely to continue good. Messrs Charles Green & Co in their "Facts for Brewers" say:—

"Those brewers who have a good stock of New York hops in their breweries for summer use may consider themselves fortunate. No other hops will keep their flavor as well. The English and Bavarian hops will not stand the hot climate of this country. Soon as the hot season commences they will begin to loose flavor and strength. The English hops which come to this country, generally are of the poorest quality grown. They have little more than half the strength of American hops. When the summer heat comes on them the little strength they have will evaporate, and beer made of them will not stand our scorching summer weather. They will do better work in England where the weather is comparatively cool. We were compelled to furnish them to our customers last summer as we had not enough New York hops. They gave poor satisfaction, but we could do no better. We shall be compelled to send to our brewers again as our stock of New York hops will be exhausted earlier than last year. Our supply of early purchases will all be shipped before the end of the present month. Then we must depend on the scattering lots which we can find. These will not offer in sufficient quantities for the demand, and we can do no better than furnish English or such other foreign hops as are in the market."

Artificial Butter.

A new kind of butter is about being offered for the acceptance of the public. The process of making it is as follows:—Fresh beef suet is first mechanically cut up by means of circular saws fitted to a cylinder, and is next placed in a vessel containing water, carbonate of potassa and fresh sheep's stomachs previously cut up into small fragments. The temperature of this mixture having been raised to 45 degrees, the joint influence of the pepsine of the stomachs and heat, causes the fat to be separated from the cellular tissue. The fatty matter floating on the top is decanted, and after cooling, submitted to very powerful hydraulic pressure. The stearine is used in candle-making and the semi-fluid oleomargarine is used for making the artificial butter in the following manner: 50 kilos of the fat are poured, along with 25 litres of milk and 20 litres of water, into a churn, while there is added 100 grms. of the soluble matter obtained by soaking for some hours in milk from cows' udders and milk-glands. A small quantity of annatto is also added, and the operation of churning is then proceeded with. The butter thus obtained is well washed with cold water, and if required to be kept for a long time, melted by a gentle heat to eliminate all the water. According to there ports of sanitary committees, this artificial butter is averred to be an excellent substitute for the genuine article.

Drainage and Steam Culture.

Mr Bailey Denton has long been known as perhaps the highest agricultural-engineering authority in England, and as the able advocate of deep drainage. In support of his views, a Yorkshire gentleman, Mr. A. S. Milbank, has recently addressed a letter to the *London Times*, of which the following is an extract:—

"The home farm at Barningham-park is situate in the narrowest part of England, in the north-west of Yorkshire, about 35 miles betwixt sea and ocean, at an altitude of 600 ft No less than 56½ inches of rain fell there during 1872, equal to over 5,600 tons of water to the acre These conditions are not very favorable to autumnal wheat cultivation, yet, in spite of 5½ inches of rain in October, I was enabled on my heavy land to sow 40 acres of wheat It is rare this year to find any wheat sown in the north of England. My wheat has come up well; and now in the latter part of January, it is the general observation, how promising it looks. To what cause, then, do I owe so successful an issue to my venture after a downfall so unexampled? Without doubt, primarily, to thorough deep drainage on Mr Bailey Denton's system—drains 11 yards apart, four and a half feet deep, assisted by previous deep stirring of the land by Fowler's double steam engine apparatus. Thus, by the rapid filtering of the rain through the soil, a 24 hours' north wind enabled me to "catch" a season. I was not slow to avail myself of the opportunity, and concentrated the whole staff of the farm upon the 40-acre field. True, our haste required the Suffolk drills to be set aside, and all done by broad-cast sowing in double-quick time; nor was such speed unnecessary, for hardly had the drills covered the seed before that steady downpour was resumed, which has ever since hindred farm out-door operations. I feel how much my success is due to the two systems in combination —those of deep-drainage and steam cultivation. Not only is the water never stagnant, but airing the soil, and perhaps even manuring it with the gases of the atmosphere above, prevents the plants from rotting."

Forest Culture.

Mr. Andrews, American minister to Sweden, has made a report to his government on the Swedish system of managing the forests of that country. In it, he says:

"The forest land in Sweden embraces 30,000,000 acres or about three-fourths of the entire surface of the country. Government exercises authority over 5,000,000 acres, which territory is divided into six districts, with a forest inspector and six foresters or masters for each district Forest regulations were issued by the Swedish government as early as 1647, previous to which private owners were required by law to plant and protect from cattle two timber trees for every one cut. In 1838 government established the Royal Forest Institute, which is located at Stockholm. The course of study at this institute occupies two years, tuition being free, and the graduates are designed for positions in connection with the administration of forestry laws in the different districts of the country. Besides this institute there are six forest schools, chiefly supported by the government, located in each of the different divisions into which the forest lands of government are divided. In 1867, 21,850 pupils in the common or "folk" schools of the country also received instruction in horticulture and tree planting. Great attention is given to the cultivation of the oak, larch, beech and pine; and in 1850, the chief director of the Forest Institute said that if forest growing was properly attended to in the country, its export of timber would return a greater revenue than the export of iron—which is everywhere acknowledged to be of superior quality. To show the minuteness of detail of the legislative enactments, it may be mentioned that trees on government lands which are to be felled are divided into twelve classes, of which the following are a part: trees for masts, for beams, for larger saw-timber; for smaller saw-timber, wind-fallen trees for various purposes, trees that have been damaged by fire, &c., even down to the trees used for the production of tar, charcoal and potash are all regulated in the several legislative enactments.

The pine forests of Canada are fast disappearing before the merciless inroads of the woodman. When shall we have a national system enforced, for planting new forests in their room?

The Dairy.

Milk Fever.

Through the spring of the year, when the cows most commonly come in, cases of puerperal or milk fever most commonly occur. Parturition is generally attended with considerable feverish excitement of the system, while the sudden change of powerful action from the womb to the udder causes much constitutional and local disturbance and inflammation. The nervousness sometimes extends to the whole system. It manifests itself sometimes a few hours after calving, but often not under two or three days, and the cow cannot be considered safely over this trying period till four or five days are passed, as milk fever will not appear later than that. The apparent symptoms are a loss of power over the motion of the hind extremities, and an inability to stand. Sometimes there is a loss of sensibility in these parts so that a deep punch with a pin is unfelt. The disease must be taken in hand immediately or it will prove fatal, as it most commonly does, from a neglect to observe the animal carefully till the manageable symptoms have passed, and extreme debility has come on. The cow is unable to rise. Prostration of strength and violent fever are brought on by inflammation of the womb.

Cows in high condition are most subject to this disease, and those put from low on to high feeding too suddenly. It may be induced by hot drinks that are sometimes given after calving. Great milkers are more liable to it than poor ones. Improper treatment or neglect by preventing the secretion of milk, and throwing it back as it were into the system will increase it. The farmer should therefore, be on the watch for it after the cow calves. The first appearance of it will be a restlessness, frequent shifting of position, occasional pawing and heaving at the flanks The muzzle will be hot and dry, the mouth open, the tongue perhaps out at one side, the look wild, the eyes staring The animal will moan, and soon get to be irritable Then she will begin to grate her teeth, and foam at the mouth, and toss the head about. The udder is hot, enlarged, tender, and if there is a suspension of milk, the cause of the trouble is clear. Take a pound of Epsom salts, or if the cow is very large a pound and a half and dissolve in a quart of boiling water; add red pepper a quarter of an ounce, and the same quantity of caraway and ginger, mix and add a gill of molasses, and give lukewarm. This will act on the bowels, and if it does not, give another dose a few hours after with double the quantity of ginger, pepper and caraway. When the stomach is aroused and purging begins, the fever will soon subside. If there is not some action of the bowels in a reasonable time, it is safest to call in a veterinary surgeon, as when the disease goes on till the animal is prostrated, she is generally passed saving. When the disease comes on at this season, if taken in time, it can be cured, but if it comes on in hot weather in summer, it is very often fatal. We say, therefore, that the farmer cannot be too careful to watch and take care of his cow at the time of calving.—*Mass. Ploughman.*

Perfect Butter.

There have been in the Providence market this winter a few hundred pails of butter which have a history. They came from a single dairy in Illinois, and are uniform in quality, hardly distinguishable, indeed, one from another, although made in summer, autumn and winter. They are sweeter and have a fresher and more delicate aroma than any ball butter we were able to find last summer in Rhode Island. They contain little salt and no buttermilk. This perfect butter is churned daily from fresh milk. Here lies the secret. Milk one hour,—butter the next. No setting of milk pans and skimming and storing up of cream. No subjection of milk and cream to atmospheric, electric and thermal changes. No expensive cellars with running water to secure fresh air and equal temperature, or, in default, a perpetually fluctuating product of butter. In place of the hand churn, the power churn. In place of the inefficient hand working of the butter, jaws worked by power, squeezing out the buttermilk, just as the melted slag is squeezed out of the softened iron in puddling

The dairy farm at which this butter is made has, we believe, a hundred or more cows, in addition to which milk is purchased from the neighboring farms. It is, in other words, a factory, producing butter on a large scale of uniform, excellent quality Our theory of butter making has always been to carry the milk from the cows directly to the churn, and only to delay churning long enough for the milk to cool to the proper temperature. There would then be two churnings each day, and the quantity should be sufficient to make one or more complete packages for the market at each churning. Theoretically, also the caseine should be immediately separated from the residual milk and buttermilk, and the ultimate products, butter and cheese, be the only substances remaining to be cared for, from day to day. In such a factory, power and good machinery would substitute hand labor, and a uniformly good product of butter should result. The cheese would be of secondary, though of considerable importance.

At the present time large quantities of French butter of uniform quality are sold in the English market at a good price. Meanwhile American butter in England brings much less than its value from the fact that no two packages are alike, even from the same dairy. This holds good of Rhode Island butter in our own market. The butter from the same dairy in successive weeks in summer has hardly a recognizable resemblance. A principal cause of this diversity and inferiority of product is the difficulty or impossibility of keeping milk and cream in our variable climate, and in any but the best appointed dairy rooms or cellars. The remedy for this is in churning fresh milk instead of stale cream.—*Providence Journal.*

Churning.

Some do not skim at all, but churn the whole milk. This requires more power to churn, but it does away with the trouble and waste of skimming, and produces the largest yield—for, if the work is properly done, it secures all the butter. Where the milk is churned, it should be done soon after it begins to sour. There is nothing gained in quantity by allowing it to go farther, but there is a loss in quality. This loss occurs in two ways—by the acid consuming the oil in the cream, and by the caseine mixing with the butter, which can not be got out without extra working—and the more butter is worked the worse it is for it. If we could get all the buttermilk out without working at all, it would be all the better. But we have not yet discovered how to do that. The advantage of churning the whole milk is illustrated by an experiment made by Mr. Rensselaer Day, of Otego. Sept. 12, Mr. Day churned 322 pounds of whole milk, which made 21 pounds of butter—taking only 15⅓ pounds of milk to make a pound of butter. This is a most remarkable yield for a dairy. The quantity of milk required for a pound of butter at our butter factories ranges from 24 to 30 pounds. The best bloods and crosses of Durham, Holstein and Ayrshire require from 20 to 23 pounds of milk to make a pound of butter. September 13 he skimmed the milk and churned the cream. He had 365 pounds of milk, and got 22 pounds of butter—taking about 16⅔ pounds of milk to make a pound of butter, or 1⅓ more pounds of milk than it did when he churned the whole milk In both these experiments the milk was allowed to lopper

On the 14th, Mr. Day, skimmed the milk sweet He had 355 pounds of milk and made 17 pounds of butter—taking a little over 20⅞ pounds of milk to make a pound of butter. This is 5⅓ pounds more than it took when he churned the cream of loppered milk. This shows a very marked advantage in favor of souring—at least so far as quantity is concerned. But our impression is that if the whole milk had been churned just before it loppered—or when it began to thicken on the bottom of the pails—his yield would have been quite as large and a little finer in quality.

The following table shows the results of seven days' churning, Mr. Day allowing his milk to lopper, as is his custom:

	lbs. milk.	lbs. butter.
June 15	410¾	23
" 16	434	27
" 17	430½	27
" 18	476	28
" 19	441	28
" 20	429¼	26
" 21	439½	25
Total	3,061	184

The average number of pounds of milk for a pound of butter is 16.61, which is an extraordinary yield. The cows are grade Devons, one Jersey cow being used in the herd to give color to the butter. It will be seen that the yield of different days is quite irregular—the largest day's yield of milk producing no more butter than others. Probably variations in the weather account for the discrepancies.—*Michigan Farmer.*

Water for Dairies.

One of the requisites in making butter is cool, sweet water—as pure as it can be obtained from a well-kept spring. If water is used to set the pails in for butter making, or to run under and around large pans, like the Jennings, or Jewett, or Orange county, of course it does not matter so much about its purity, so no bad odors rise from it. It is only necessary that it should be of the right temperature. But for cows to drink, for washing milk pails and other utensils, and especially for washing butter—if it is washed—the water cannot be too pure. Hence, soft water is better than hard water, other things being the same, because the hard water is charged with lime, and lime is bad for butter, whether introduced through the water or the salt. But all soft water is not pure water. Brook water may be soft, but it is charged with particles of organic matter which will hasten decomposition in the butter. Fresh rain water is soft, but it is charged more or less with ammonia, which will injure the flavor, and near our cities and large villages, it is likely to contain also creosote, from the smoke of so many chimneys. This is especially the case with the first rain that falls after a long dry spell What is wanted, then, is not only soft water, but pure water—that is, as pure as it can be made by its filtering through a clean sweet soil, into a spring or well. Hence, great care should be taken that no foul matter collects around your springs or well, and that no surface water runs into them. If it does, it will injure the flavor of your butter and hurt its keeping qualities, though you may not at first be able to perceive it.—*Working Farmer.*

Experiments with Milk Pans.

In our neighborhood, and, indeed, in all the surrounding country, we find the "crocks" made of clay are generally used, and however particular we may be in selecting these crocks, after a while the glaze cracks and scales off, leaves holes, often minute ones, (but the smaller the more troublesome), which are filled with milk, which in turn sours, and not being thoroughly removed, sours the milk early. We discarded them for stone jars, holding two gallons; these were an improvement, being easier to keep sweet and clean, but more difficult to handle on account of their weight. Hoping to do still better, the cream not seeming to rise as rapidly as required, we supplanted these with tin pans holding from three to three and a half gallons, with a fourteen inch surface, (diameter). These also had their objections, being too heavy to lift from water, and having three seams, etc. We now have the tin pans with one seam only—eight and a half inches in height, with a surface of eleven inches in diameter, and bottom seven inches in diameter; they are easily handled, holding two gallons. To prevent their corroding we paint them on the outside, we also have tiny round feet or nibs (three) on the bottom, which prevents them wearing through so readily. In summer we keep our milk in troughs of running water, six inches deep. These pans give entire satisfaction.—*Cor. Maryland Farmer.*

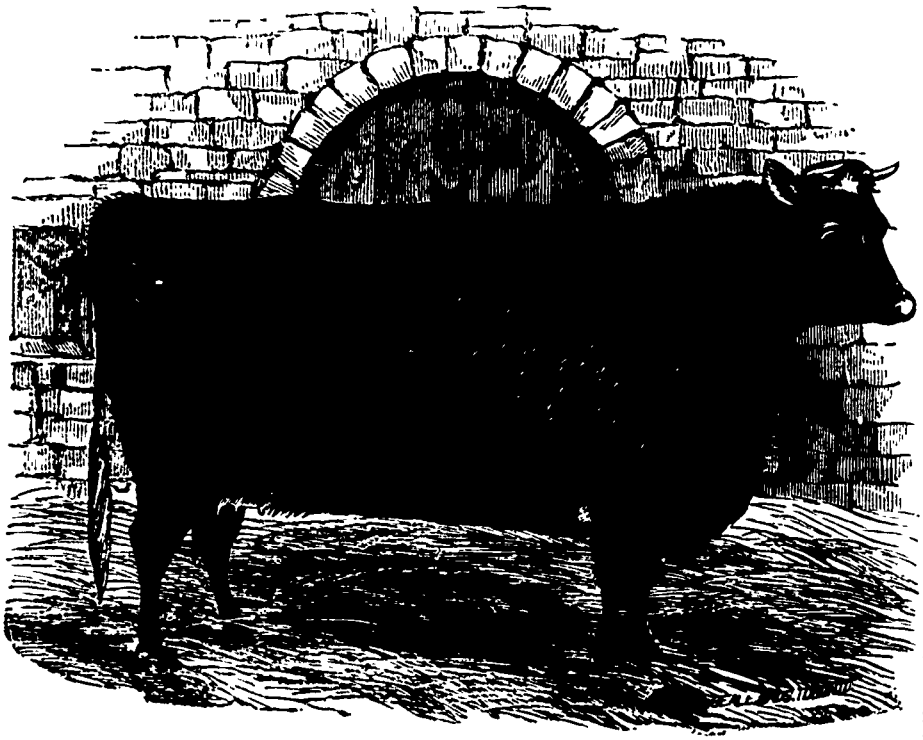
Climate Affects Cheese.

Under the heading "August Cheese of 1872," we had the following from an experienced dairyman. "It would appear from it, that climate has much more to do with the quality of cheese than has been supposed or expressed heretofore. It seems that what they call "muggy" weather, in which the air is hot, damp and lifeless, affected injuriously the quality of cheese made during its continuance, though it may not affect materially, if at all, cheese made immediately previous. If the cause of the poor cheese made in August is charged to the right source in the article alluded to, can we not find it a good reason why California cheese should when properly made, stand at the top of the market? The kind of weather, "muggy," is unknown here; we have long seasons of hot, but generally dry weather; and when we have rain, it is usually cool. Our hot weather produces no fever in animals exposed to its influence where they have access to an abundance of pure water. It would seem, therefore, that in the very conditions of our climate, which we sometimes feel so burdensome, are to be found the elements and causes that constitute it the very acme of perfection for dairy purposes. And particularly does this hold good with all the vast region of foothill and mountain pasturage with which our State abounds, where lightness and dryness of the atmosphere, with abundance of pure water, seems to combine to make it the paradise of the dairyman."—*Ohio Farmer.*

Breeder and Grazier.

Moreton Lodge Herd.

The fine short-horn cow *Cambridge 10th*, of which a portrait appears on this page, is the property of Mr. F W. Stone, of Moreton Lodge, near Guelph The Cambridge family was established by Mr Stone Seventeen years ago, he imported from England the famous cow *Cherry Pie*, bred by the late Mr Jonas Webb, of Babraham, Cambridgeshire. *Cherry Pie* had eight calves—four bulls and four heifers; the four heifers were named respectively by Mr. Stone, *Cambridge, Cambridge 2nd, Cambridge 3rd*, and *Cambridge 8th*,—and from these a number of fine animals have descended. One of these descendants is the cow here illustrated, and the following pedigree shows the



CAMBRIDGE 10th.

excellence of the stock, through which she runs back to the famous herd of Mr. Christopher Holmes.

"CAMBRIDGE 10TH, red and white, calved 15th October, 1867, got by Third Grand Duke [322], 2292, (17993)

Dam, Cambridge 2nd by 12th Duke of Oxford (1884, 231-, (17742).
gr d Cambridge by 3rd Grand Duke 2292, (17993)
g gr d Cherrypie (Imp.) by Lord of the North (11743).
g g gr d Celia by 3rd Duke of Northumberland (5647)
g g g gr d Cornflower by Bashaw (1692).
g g g g gr d Columbian by Helmsman (2109)
g g g g g gr d Columbia by Columella, (904)
g g g g g g gr d Charlottina by Regent (544)
g g g g g g g gr d Charlotte Palatine by Palatine (478).
g g g g g g g g gr d Charlotte by Palmflower (480)
g g g g g g g g g gr d Crimson by Patriot (486)
g g g g g g g g g g gr d Young Millbank by Driffield (225)
g g g g g g g g g g g gr d Millbank by C Holmes Bull (314)

Another notable family of Short-horns, known as the *Isabella* tribe, was raised by Mr. Stone from the fine red and white heifer *Isabella 2nd*, imported by him from England in 1856 She was bred by Mr. S. E. Bolden, Lancaster, and sired by Bucaneer (11217) from Isabella Howard by Yeoman, (12220), and her pedigree ran back to Mr Barrell's Bull of Burdon, (1769) *Isabella 2nd* produced five heifer calves, named respectively Isabella 3rd, 4th, 5th, 14th and 19th, and these, in their turn, added largely to the numbers and laurels of the family, of which there are now over twenty females in life.

But probably the best of Mr. Stone's Short-horn families is the Sansparell tribe—sprung from the fine roan heifer *Sansparell*, imported by him in 1855. This animal was bred by Col. Kingscote, Gloucester, England, and got by his famous bull Gauntlet, (10260), from Serenade, by Charles 1st, (8947), g dam Seraphina, by Earl of Essex, (6955). *Sansparell* produced four heifer calves, named respectively Sansparell 2nd, 3rd, 5th and 8th,—and these, in their turn, increased the numbers of the family very largely.

Moreton Lodge, has been the residence of Mr. Stone for more than twenty years past. The farm of which it is the manor-house, is in the immediate vicinity of the flourishing town of Guelph, and contains 550 acres of good land—with 200 acres more about three miles to the south-east, worked in connection with it. In 1854, Mr. Stone made his first importation of thorough-bred stock from England; and by annual importations and judicious breeding he gradually collected an excellent herd of pure-bred animals. Short-horns, Herefords, Cotswolds and Leicester sheep, Berkshire hogs, Sussex punch horses and poultry have received his special attention; and the large number of fine animals annually distributed over the country, for many years past, from Moreton Lodge, have not only reflected great credit on Mr. Stone, but contributed immensely to the prosperity of Canadian stock farming.

Moreton Lodge is likely to be as notable a place in the future as it has been in the past—Mr. Stone having just sold the property (the home farm of 550 acres) to the Ontario Government, for the sum of $75,000, as a model and experimental farm for the Province We do not know what are Mr. Stone's intentions as to the future, but he will always be known in Canada as one of the boldest of the pioneer importers of good farm stock, who conferred enduring benefit on the country.

The entries for the short-horn show and sale at Birmingham, which is the only one of the kind held in England, closed on 22nd February, and include no fewer than 177 animals, about seven-eighths of which are bulls, from ten to eighteen months old. The herds of nearly all the leading breeders are represented in the entries.

English Short-horn Sales in 1872.

We have received Mr. Thornton's First Annual Circular for 1873, and find in it the following summary of Short-horn sales by auction in 1872:—

Name	No. of Lots.	Average £ s. d.	Total. £ s. d.
Loftus H. Bland (*deceased*)	49	24 15 2	1213 5 6
T Holme Parker	17	42 11 1	723 0 0
Lord Fitzhardinge (*periodical*)	49	34 17 3	1708 7 0
W. Bolton (*annual*)	34	34 8 8	1170 15 0
J Clayden (*deceased*)	32	73 3 5	2341 10 0
Miss Barroby and Mr. Harland	48	37 0 0	1775 0 0
T. E Pawlett (*deceased*)	40	195 18 7	7837 4 0
W Nevett (*selection*)	51	26 2 0	1330 17 6
J N. Beasley	37	56 19 1	2107 7 0
Messrs. Atkinson	75	69 19 6	5173 7 0
T. Lamb	40	28 11 8	1143 9 0
J Dickinson	34	51 9 0	1749 6 0
J Croudson	41	33 18 2	1390 4 0
E. Bowly (*selection*)	30	153 1 9	4592 14 0
Messrs Arkell	48	29 18 0	1435 7 0
Messrs. Perry	96	32 17 4	3155 5 0
Sir J. Lubbock, Bart, M P	26	27 9 3	714 0 0
G. Barton	44	34 3 0	1502 11 0
G. E. Frere	23	32 13 9	751 16 0
Marquis of Exeter (*selection*)	23	54 18 6	1263 3 0
W. Humphreys	47	28 17 0	1356 1 6
J. W. Larking (*selection*)	60	43 13 2	2182 19 0
F. Lythall	33	38 6 10	1265 5 0
Lord Braybrooke (*selection*)	51	65 10 2	3341 2 0
J H Blundell	40	39 15 1	1590 4 6
W. Woodward (*selection*)	62	35 5 6	2187 3 0
T. Walker	31	51 12 0	1599 13 6
W. Tippler	32	35 6 9	1130 17 0
W Angerstein (*selection*)	84	41 15 0	1419 12 0
Rev W Holt Beever	45	50 0 0	2250 3 0
W W. Slye (*selection*)	32	46 8 7	1485 15 0
T Bracewell	31	88 9 5	2742 12 0
Earl of Dunmore (*selection*)	64	242 18 9	13118 14 0
J. Webb	79	27 4 6	2150 18 6
Messrs Harward and Downing	61	243 8 2	15458 2 0
T. Allen	52	27 12 0	1435 7 0
C Barnard (*deceased*)	79	33 17 0	2673 16 6
Rev W. Mountray (*deceased*)	29	36 7 6	1054 14 6
R. Blackwell	42	67 0 0	2814 0 0
J. Caddy (*deceased*)	56	51 16 1	2901 3 0
R. B. Brocklbank	55	37 3 0	2043 6 0
W Bradburn	51	36 2 3	1841 14 0
W Playne	28	32 15 2	917 3 6
Sir J W. C Hartopp, Bart	11	33 4 4	365 8 0
Total, 44 Sales	1922 head	£58 9 8	£112,404 12 0

The sale season of 1872, like that of 1871, has been distinguished by some of the highest prices that have ever been realised for animals of the Short-horn breed, or, indeed any other bovine race. The number of sales as well as the number of head sold is slightly below that of last year, but the general average about £2 10s. higher. By the outside public the astonishing sums paid for individual animals of fashionable blood is looked upon almost in the light of a mania; these prices are, however, the result of personal enterprise, of increasing demand, and of that abundant wealth and prosperity which the country has been developing during the last few years. Extreme prices may be a source of speculation; but it is difficult to estimate the value of cows when their bull calves sell readily for a thousand and twelve hundred guineas each, and a three-year old bull realizes £1732 10s., or when yearling bulls are let from two to three hundred guineas each for the season. An objection has also been raised against such prices on the ground that they are paid for animals of certain pedigree, irrespective of great individual merit the animals themselves may possess; yet, nevertheless it is an admitted fact that the consecutive use of purely-bred males, not only perpetuates purity of pedigree, but effects improvement and fixity of type beyond all other methods.

The remarkable result and even character of the sale of the late Mr Pawlett's herd in Bedfordshire was one of the surprising events of the spring. It was followed by an equally good sale for the large Peepy herd in Northumberland. Mr. Bowley's draft sale, when Second Duke of Tregunter made 900 gs., was also another great spring average. But these were eclipsed by the astonishing results of the draft sale at Dunmore, when three Oxford heifers realized 3070 gs.; and the dispersion of the Winterfold and Turner's hill herds, which was a more even sale, and increased by the extraordinary price of 1650 gs., given for Eighth Duke of Geneva. Mr. Bracewell's average in the autumn was also very high, considering the herd was much affected with foot-and-mouth disease at the time of the sale.

Several large sums were paid privately during the year for animals of fashionable blood; these, if included in the above list, would swell the average, though not largely increase the number sold. Twenty-six animals of the Duchess, Oxford, Red Rose, and Princess tribes, as well as two young bulls of Booth blood sent over by Mr. Cochrane, one of which unfortunately died on the voyage, have been imported to this country from America and Canada since October, 1871, by the Earl of Dunmore and Mr. Cheney. These animals were purchased at great cost, which,

coupled with the risk and expense of shipping across the Atlantic, is further evidence of the present demand for animals of high pedigree. The export trade has not been very great, although a few prize animals were purchased in the spring at high prices for Canada, and a good shipment was made to New York. The outbreak of foot-and-mouth disease in Australia caused lengthened quarantine regulations to be enforced, and somewhat deterred exportations to that large cattle-breeding colony during the latter part of the year. For many years foreign, colonial, and American buyers paid even higher prices than our home breeders; but this practice is now reversed, and farming, coupled with the breeding of improved stock, is one of the leading pursuits of the age.

AYRSHIRE COWS.

This excellent breed of dairy cattle is at present attracting a degree of attention in Canada and some portions of the United States, that it has not before received. Some of our most experienced and successful breeders are raising large and valuable herds of them; and at our country and provincial shows the Ayrshire boxes make a capital appearance.

The Ayrshire cows are quite hardy; they thrive on very ordinary pastures; and their milk is of excellent quality and large in quantity in proportion to their size. When milk only is wanted, and the fodder is not rich and abundant, the Ayrshire is a very profitable cow. But the small size is a serious drawback when the females have to be fattened off for the butcher and a complete bar in the way of raising steers or oxen.

The points of a first-class Ayrshire cow are thus laid down by the Ayrshire Agricultural Association: HEAD short, forehead wide, nose fine between the muzzle and eyes, muzzle moderately large; eyes full and lively; horns wide apart, inclining outwards and curving slightly inwards. NECK long and straight from the head to the top of the shoulder, free from loose skin on the under side, fine at its junction with the head, and the muscles symmetrically enlarging towards the shoulders. SHOULDERS thin at the top, brisket light; the whole fore-quarters thin in front, and gradually increasing in depth and width backwards. BACK short and straight; spine well defined especially at the shoulder; the short ribs arched; the body deep at the flanks, and the milk-veins well developed. PARTS long, broad and straight; hook-bones wide apart and not much overlaid with fat; thighs deep and broad; tail long and slender, and set on level with the back. MILK-VESSELS capacious and extending well forward; hinder part broad and firmly attached to the body; the sole, or under surface, nearly level; the teats from two to two and a half inches long, equal in thickness and hanging perpendicularly; distance apart of the teats, at the sides, should be equal to about one-third of the length of the vessel, and, across, about one-half of the *breadth*. LEGS short, the bones fine and the joints firm. SKIN soft and elastic, and covered with soft, close woolly hair. THE COLORS preferred are brown or brown and white, distinctly defined.

The estimation in which Ayrshire cows are held among our neighbors will be gathered from the following statements of prominent authorities on such subjects:—

Mr. Lewis F. Allen, of Blackrock, says:—"The Ayrshires are a good breed of cattle, useful, and eminently qualified for the dairy, and capable of perpetuating among themselves their good qualities, are facts now well established, both in Scotland and America." He adds, "Their trial here has been successful. They are hardy, healthy, well fitted to our climate and pastures, and prove good milkers, both in the imported animals and their progeny. Their flow of milk is good in quantity, and fair in quality; yet, we may be permitted to say, that in this country they do not yield so much in quantity as it is alleged they have produced in Scotland. The chief reason for this is obvious. Ayrshire has a moist climate—an almost continual drizzle or moisture pervading it—making fresh, green pastures; a cooler and more equable temperature in summer, and warmer in winter, than ours."

Mr. Willard, of Utica, says:—"The Ayrshires originating on the western side of Scotland, in a moist climate, have been bred specially for milk; and for this use no one questions their value. They are medium in size, hardy, healthy, well fitted to our climate and pastures; and for the milk farmer and cheese dairyman, where milk or its products alone are the object, considering the size of the animal, the food required for its keep, the great variety of soil and surface of the country to which it is adapted, perhaps no breed can show a better record."

Prof. Cook, of the New Jersey, Agricultural College, writes that on the farm connected with that institution, the average Ayrshire are better milkers than the common stock, and are always in better condition on the same food. At the Norway Agricultural College very favorable reports are given of the Ayrshires.

Col. Geo. E. Waring, Jr., a noted breeder of Jerseys, says:—"The more I see and hear of them the better I like them. They are docile, intelligent and motherly; and when they cease milking they take on fat readily. For all purposes except butter making I believe they are the best farmers' cows."

Mr. Flint, author of "Milch Cows and Dairy Farming," says.—"The Ayrshires, as a class of animals, are not so much a butter breed as a milk breed. They give more milk of a high quality in proportion to the food which they consume than any other breed, but the butter would not be so highly colored as that of the Jerseys, the Brittanys, or other similar breeds. The milk is of a very good quality; a more nutritive milk to feed to children than the milk of the Jerseys, but it does not make so much butter, nor of so high a color, and would not bring so high a price in the market, even if it were made equally well."

Importance of Thorough-bred Bulls.

In all thorough-bred animals of whatever kind, the good qualities are *concentrated*. That is to say *they breed alike* throughout, from father to son, mother to daughter, and so on down to indefinite generations. There is unmistakable likeness prevailing among them. Our native cattle are made up of incongruities in size, shape, color and quality. No uniformity of likeness exists among them. Some are good, more of them indifferent, both in appearance and quality. Some of the young resemble the sire, others the dam, and a great many neither, but take the appearance of ancestral relatives generations back. They have no fixed or permanent character, but are an aggregation of various qualities and blood, possessing (owing to their miscellaneous mode of descent) no particular characteristics which can be depended on. It is this uncertainty which detracts from their value. Use a thorough-bred bull to these miscellaneously bred cows, however, and his blood is so strongly infused in their offspring, by his own fixed characteristics that his stock at once partake largely of his own quality and appearance. Now let the full blood of this bull be repeated in the half-blood heifers, and his blood becomes still stronger in them, and their stock more nearly resembles his blood (there being two crosses of it in them) than that of their dam, which has one-half the inferior or native blood, and so on to any number of these full-bred crosses, until the appearance of the progeny resembles the thorough blood almost beyond a distinction to the inexperienced eye. On the other hand, among the the progeny of the cross-breeds of the first generation, or half-breeds, some very choice ones will be found partaking largely of the qualities of the sire.

An unpracticed breeder may think that with so promising a calf, a bull may be raised that will answer his purpose and the quality of young stock from common cows (from which the bull sprung) will be good enough, and therefore he uses him for breeding accordingly, and finds his progeny in every way inferior and wonders why it is so. The reason is plain; this half-bred bull had in himself, one-half of the inferior or native blood, which was just as strong in him, and as likely to transmit its inferior quality through inferior dams as his own share of the good blood that he has drawn from his sire, and thus there is little progress made in improvement from this mongrel bull. Still he is better than the "native" bull, and should be used when a better one cannot be had. The same result will occur from breeding these grade animals among themselves. The same inferior blood is quite as likely to strike out among them as the superior, and the incongruity appears in their various characteristics and all higher improvement ceases. Hence there is no certainty of *continuous* improvement otherwise than by the use of thorough-bred bulls.—*Lewis F. Allen.*

Warts on Cattle:

The veterinary editor of the *Western Farmer*, thus states the case in relation to warts on cattle, and their cure. There are three kinds of warts which trouble horses and neat cattle. One is upon the skin, occupying a large surface in proportion to the size of the wart. To get rid of it, it must be excised—cut about half through the skin, then with a hot iron, at a dull red heat, well cauterize or burn the surface. The second kind is under the skin, and is encysted or inclosed in a sac, has not much organization or vitality, and is moderately easy to dissect out. Cut through the tumor lengthwise, then carefully skin off or out, the encysted lump or tumor: be careful to burn out the cyst or sac, otherwise it will be likely to form or grow again; sew up the cut, leaving an opening at the bottom, and the job is done; dress with common turpentine four or five times—inject with any kind of a syringe. The third kind is the most formidable kind of wart. It is of a vascular nature, soft, and upon the slightest touch it bleeds. In warm weather it is very offensive; in fact it is a fungus excrescence, of great annoyance to both the animal and the owner. This requires the practical surgeon and knife for its removal, for, whilst I have removed a great number without losing a single patient yet I must confess I have suffered much annoyance and perplexity by the somewhat serious consequences after performing this operation.

Take care of the Calves.

Much of the future growth, and in fact much of the profits of the farmer arising from his stock, depends upon the care which it receives during the first year. I do not wish to be understood by this that if a farmer takes good care of his stock the first year, he can afterward let them run hap-hazard; every good farmer will see that his stock is at all times well cared for. But the first year is the foundation, it is the starting point of their future growth. There are many farmers who are in the habit of giving their calves nothing but whey from the time they are about three weeks old until they are weaned. They are then left to run and pick their living as best they may until winter, when they are taken to the barn and put into some little back hovel, with nothing but hay, till spring, or, as I have often seen, turned into a stack. In either case, they are when spring comes, so stunted and poor that they make but a slow growth ever afterward. Consequently, when selling time comes, the farmer finds his stock far behind in size and price, of his neighbors who cared well for their calves. One instance of this came within my knowledge. Some steers raised as above sold for $15, while those of a neighbor, which had been well cared for while young, sold readily at $25, The quality of the stock of the former was fully equal to the latter to start with.—*Correspondence Ohio Farmer.*

Keep Cattle Growing.

The most successful breeders of horses, cattle, sheep or swine, know from experience that although they may possess the best breeding animals, they will not be successful in producing superior stock, if a continuous growth of the young animals is not kept up. In order to begin in time at this indispensable preparation for success, the brood mares, cows, ewes and sows are most carefully and suitably fed while with young, and as soon as the young animals make their appearance, they are taken the greatest care of, the dams being suitably fed while suckling, and when the young ones are weaned, they are not supposed to want for food or drink. By this means a continuous and rapid growth is kept up, and the animals attain a large size and heavy weight at an early age. When breeding animals are not properly fed and comfortably sheltered in winter, the bad effect of such treatment is not confined to their own want of condition—it is shared by their progeny, and can never be remedied, When young stock are not fed well and comfortably sheltered in winter, their growth becomes stunted, and no subsequent amount of good treatment can repair the damage. Young animals may suffer for want of proper provender in summer and in autumn, as well as in winter, and when this happens it stops continuous growth, and prevents ultimate success in the object of the breeder.—*Working Farmer.*

THE LAST MILK FROM THE UDDER.—It has been shown, that the last cup of milk drawn from the cow's udder contained sixteen times as much cream as the first one. This separation of cream from milk takes place in part in the udder of the cow, particulary if the cow is suffered to stand at rest for some time previous to milking.

Poultry Yard.

Raising Chickens.

The time to assist nature in developing the size and growth of fowls is early chickenhood. During this time the frame of the future bird is moulded, its size increased or its growth retarded, just in proportion to the degree of care and attention then bestowed. Whatever be the object sought in raising chickens, whether to supply the table with delicious food, the breeding yards with choice stock, or the exhibition pen with prize birds. Size, with one or two exceptions, is one of the principal points looked for, and this can only be obtained to a degree of perfection by the proper treatment of chickens from the time they are hatched until they arrive at maturity. Feed well, feed often, giving no more at a time than will be all picked up, and keep the chicken pen scrupulously clean, are rules which must be strictly adhered to by all poultry fanciers. Inattention to cleanliness brings on nine-tenths of the diseases to which chickendom is liable, and is the cause of so many poor sickly looking fowls frequently to be found in poultry yards; and to it may be attributed the large proportion of deaths which occur among chickens. Let fanciers on this side the Atlantic bear in mind that to enable them to compete successfully for a Birmingham prize cup, not only must care be taken in the mating of fowls for breeding, but also greater attention be bestowed on the feeding of chickens than that usually given. Without this we cannot have size, and without size all breeders know their chance of success in a show-pen is very much lessened, and neither are small birds such as should be placed in a breeding yard.

For a little time at least the food for young chicks should be mixed with milk instead of water, and a little meat of some kind be given every day For very early chickens, new milk warmed, given to drink early in the morning, has a wonderful effect in bringing them through cold weather, and they soon get very fond of it; but neither this nor the food must be left so long as to become sour, which it will soon do, and if so cause serious trouble. After a few days at most, some kind of grain must be given in addition to the soft food or the gizzard will not have healthy exercise. Even the first day some chopped grain may be given which will be greatly relished. In a week or two this may be varied with other seeds; but as the little beaks become stronger, coarser grain may be substituted, in the shape of wheat screenings, cracked barley, bruised oats, or buckwheat. The last feed at night should always consist of some kind of grain, and a little may also be left for the brood to partake of in the morning before any one is up to attend to them, for chicks are early risers and have good appetites. The one great secret of success in rearing fine chickens is to give food so as to fully satisfy their appetites, and no more; they should never be left so long without food as to be really hungry; just so much food should be given as to satisfy their appetites and none left. In the first week every two hours will do, then for a month every three hours, and after that four times daily, for the times of supply; but something will depend upon the season, and in early spring they will need to be fed more frequently during the early stages of growth, and also require better diet, which last will, however, be compensated by the better birds. Dryness of soil is of great importance in rearing chickens. Many breeds will endure with impunity very severe cold; but none can withstand damp underfoot, which generally issues in cramped feet. At a period varying from four to ten weeks, the hen will discard her young charges; and at this time they will want special attention if they are not to suffer by the deprivation of her care. Strong-winged hens will fly up to roost, and if the chickens also be of a light and active sort and are well-grown, there is no better plan than to put a perch in the accustomed house or shed, about two feet from the ground, and to allow them to fly up to her. For several nights she will partially brood them on her perch. Large breeds, however, should not be allowed to roost, unless they are, when forsaken, nearly three months old; and not even then, except they have abundant range of grass to give tone to the system, and thus prevent crooked breasts. Chickens, when abandoned by the hen, do best if they can have a pretty good shed to themselves, floored with loose earth and fronted with open wire. At ten or twelve weeks old the cockerels must be separated from the pullets, and only chickens of about the same age be placed in a run together, else the weaker will stand no chance Without separating the sexes the birds will never grow so large, besides which it prevents trouble, as a number of cockerels may be kept by themselves in perfect peace till full-grown. At this time the birds must be well and liberally fed or all pains previously bestowed on them will be lost Their four good meals must be regularly given, mixed nice and dry, and thrown about the grass run if that be at command, or put in clean vessels if not; their water kept clean and frequently changed, and some animal food occasionally given to all except pullets, which it is not desired should lay early. Milk may be still mixed with their food and given to drink, even up to six months old, if the range is good; but for birds in confinement it should be discontinued after about three months, being in such circumstances too much for the more sluggish digestive organs.

Artificial mothers are frequently made use of by breeders when chickens are left too soon by the hen, especially for early broods; in such cases they are essentially necessary; later in the season they may be used for very young chicks, and the hens placed in their ordinary pens to again commence laying. The manufacture of an artifical mother is the easiest thing possible. Purchase an ordinary colored sheep-skin mat, about two feet long by sixteen inches wide, which will make two mothers. The mat should be chosen with fine, soft, and rather long wool, but too thick a fleece is bad as the chicks may become entangled in it and perish of suffocation. A box, or rather box-cover without a front, must then be constructed of the size required, which will be about five inches deep at the open front, sloping back to three and a half inches behind, so that the chicks may creep back to the proper place where the sloping woolly cover comfortably cherishes them. Some small holes being bored in the sides and top for ventilation, this open cover is to be sprinkled with parafine, to guard against vermin, and the sheep-skin then tacked inside with common tin tacks, fastening it round the edges only, and not too tightly, so that its own weight may cause it to bulge a little downwards. The mother is now complete, and is best set upon a large board covered a full inch deep with sand or ashes finely sifted, into which the chicks will nestle and keep themselves warm The board under will quite prevent cramp, and a little carbolate of lime sprinkled in the ashes, with the parafine above, will keep away vermin; while cleanliness is easily procured by passing the whole through a sieve daily. In case of young chickens it is necessary to confine them for some days in a small run, the mother being at one end; for if this be not done, having no hen to call them back, they may run off and get lost, but as soon as they learn to know their artifical parent this confinement may be dispensed with, only taking care always to feed them close by it For Spanish chickens, more especially, such an aid to the hen is particularly beneficial, and will save many a chick that would otherwise be lost at the stage when they are nearly bare of feathers, and require such constant nursing as the hen rarely gives them.

Slipped Wings.

There are few breeders of Asiatic fowls who have not occasionally among their chickens, especially the cockerels, a deformity, known in the fancy as "slipped" or "turned wings;" that is the primary feathers or those which ought to be nicely tucked away out of sight when the wing is closed, protruding in more or less disorder outside the others. This tendency is said to be hereditary, to some extent at least, and it mars the beauty of the bird completely, amounting almost to disqualification in close competition. Pullets, it is asserted by good breeders, are far less liable to it than cockerels, and therefore, when it occurs in the female sex it is proportionately far more serious in character. In the most aggravated form, the flight feathers appear actually twisted round the quills, so that the proper inside feather becomes outside; and in this form the affection is both strongly hereditary and believed to be incurable. But when it merely amounts to a failing to tuck the flight feathers in, without any disorder among those feathers themselves, it may almost always be cured if taken

in due time. It usually occurs about four to five months old, and in confined yards is occasioned by the bird being driven by others, or otherwise frightened, causing the wing to be so rapidly extended that in re-closing, the feathers are not properly returned, after a few times this becomes habitual and the mischief is done, and thus mars the beauty of the bird, and as it occurs at an age when the quills are not hardened, becomes permanent if not cured. In a wide run it occurs less frequently, or in the master-bird of the yard. The cure is perfectly easy, simple, and unfailing. As soon as any displacement of the feathers is observed, the wings should be carefully tucked up every night at roost, but nothing further can be done till they are grown enough to hold a ligature, when one or both wings, as required, should be carefully bound up each feather in proper position. The manner in which this is done is shown in the engraving, the wing being bound round rather tightly as near the shoulder as possible, after which the cord is carried from the knot at A, round the shoulder at B, to the inside part of the ligature at C; this is, of course, simply to prevent the ligature from slipping off, which the bird will inevitably use all his endeavors to effect Soft string, about the thickness of stout whip-cord, should be employed, and the operation be performed at night for the sake of quietness. The beginner may occasionally find he has made either the ligature or the retaining cord too slack; in which case he will next morning find the bird has again slipped the flights out of place, and the work must be done over again the following night. If, on the other hand, the shoulder or retaining cord be drawn too tight it will cut and become embedded in the web of the wing, causing the bird much pain and distress. Patience and tact are therefore required before the wings are properly tied up, and the feathers retained in their proper place, as the greatest care must be taken that every feather is placed in proper position. The bird must be kept with his wings thus tied for at least three weeks, or until the quills appear grown their full length, when the ligature may be cut, and if the result is satisfactory of course all is over, if not, the wings are to be again confined, and in some cases even so much as two months of this watchful care is necessary. There are few but may be thus cured if taken in due time. The ligature in many cases has a tendency to cut the feathers, but this may be avoided by using instead of a simple cord a diamond-shaped piece of calico with a string sewn at each end, when the shorter diameter of the calico, instead of the cord, will go under the wing at D, and preserve the wings from injury. Pullets are subject to the same fault, but not nearly so often as the cockerels; and even adult birds will sometimes require attention to their wings during moulting time, those of the Asiatic breeds more especially. If the wings are seen properly tucked up every night at roost nothing further will commonly be needed, but if the blemish should appear to be becoming habitual, it must be treated in the manner just described. Birds that have a run in a good grass field are rarely subject to twisted wings.

Hatching Eggs.

W. H. Todd, the veteran poultry breeder of Vermillion, Ohio, writes to the *Poultry Bulletin* an account of his experience with eggs that have been set and do not prove good for chickens, the experience may be valuable to some breeders and has been as follows:

"I began to set eggs the middle of February. Set Light and Dark Brahmas, Buff and Partridge Cochins. Kept breeding-stock on high dry ground, in comfortable quarters, with open fields for a range; five to eight hens with each cock, according to his vigor and activity. Dark Brahmas hatched an average of 75 per cent., Light 50 per cent, Partridge Cochins, 33⅓ per cent, Buffs, 12½ per cent Nest boxes were 16 inches square, with 3 or 4 inches moist ashes or earth in the bottom; nests of fine short oat straw, and placed nine eggs under each hen. Continued setting a large number of hens through February and March. Light Brahmas soon hatched as well as Dark, 70 to 90 per cent No improvement with the Cochin eggs.

"February and March were very cold and severe, especially March, during which fowls would not venture out doors; hence they got little exercise. Being confined myself with illness much of this time, the feeding and management of my fowls fell to others, who I found cared well for them in every particular, except over-feeding.

"Learning the failure of my Cochins to hatch, I determined to ascertain the cause and correct it if possible. The fowls were all laying well and had a good variety of grain, vegetables, shells, meat and soft food. A visit to my yard soon convinced me of the cause of unfertile eggs. I found my Cochins—the Buffs in particular—fat enough for Christmas, and the appearance of the fluff indicated a looseness, caused by constant overfeeding, obesity, and want of exercise. I ordered them to be put on "half rations" at once, with very little meat or corn, but plenty of broken bones and shell. Fed twice a day, cooked mush in the mornings, of oat-meal, bran and turnips, and a little corn-meal; in the afternoon, corn, oats, buckwheat and wheat mixed. No more at each feed than would be consumed in five minutes or less. My feeder said the "fowls would starve, they acted so hungry," but I persisted; I kept my fowls lightly and lively. Looseness disappeared, and after spring opened and the fowls had plenty of exercise, eggs hatched better. Those set in two weeks after changing feed did better; in four weeks one-half hatched, and in six to eight weeks 75 to 100 per cent. hatched. In the case of my own fowls, I know that where hens and cocks are healthy and vigorous, bad hatching, whether from unfertile eggs or partially developed chicks, may be caused by over-fattening, and the inactivity resulting therefrom, and steady cold weather; or too few hens with an amorous and over attentive cock. The same feed and treatment was given to Brahmas and Cochins. The Dark Brahmas being less voracious and more active and venturesome in inclement weather, took more exercise and kept in good breeding condition. Light Brahmas exercised less and fattened more while Cochins feed more greedily and grew fat. I noticed that many eggs had partially formed chicks in them which died in the shell, and I find that nothing so weakens the vitality of eggs, or chicks, in Asiatics, as high-feeding and want of exercise. Such is also the case with horses, cattle and all quadrupeds. Besides Asiatics, I had no failure with the eggs of other breeds, though I did not begin to set them till spring opened and the fowls had free range. Throughout the season I had chicks, ducklings and goslings hatching two or three times a week under sheds and in buildings, and May and June exposed to the effects of thunder, in all stages of incubation, without perceptible injury; and in these months of frequent thunder storms, eggs hatched the best, ranging from 50 to 100 per cent., with seldom a dead bird in the shell. I noticed one instance in particular; nine good eggs were set under hens, in box nests on the ground; two days before hatching there was a severe storm with very heavy thunder—result—seven fine goslings, and none dead in the shell. So far as I have noticed, hatching was not affected by changes in the weather, except by extreme cold, with too many eggs under a hen, and extreme heat, dryness, where a hen was setting in a close, sweltering lot or chamber, but dryness can be avoided by using grass sods and moist earth, and occasionally sprinkling the nests. The season has been dry and hot since April, but with the proper construction of nests, and care of eggs (keeping them from drying too much) my success in hatching all varieties has been good."

Sick Fowls.

There is probably no farmer or house-wife who feels more helpless when any class of animals are affected than when the fowls are ill. There needs to be much information disseminated on this subject. A very common disease among fowls is thus treated by a writer in Land and Water:—"All the feathered tribe are naturally liable to take cold, more particularly whilst very young, and the adults during the trying season of moulting. The earliest symtoms are slight loss of appetite, drooping of the tail, and a clear limpid discharge from the nostrils. It is entirely due to damp, exposures to cold winds, and imperfect housing; but there are inducing causes frequently combined, improper and insufficiency of food is one which materially aids it by rendering the system poor and weak and incapable of resisting or shaking off any kind of hardship, however light. Breeding in and in, that is from stock related to each other, is another means by which artificially reared families are certain to become weak and the seed of various diseases quickly sown, and the constitutions degenerated with an inevitable certainty. Seeing therefore, the means by which the stock is to be prepared for resisting the simplest disorders should an attack come upon them in the form of a cold, take a few cautions for removing the cause, if it can be found, by extra dryness of the soil upon which they rest, and taking special care that they are not in the vicinity of stagnant moisture. There are few cases of simple catarrh that will not speedily yield to a little more generous feeding than they have been used to. Crusts of bread soaked in spiced ale is wonderfully efficacious, and should be given in addition to other meals if they will partake of so much. If the birds have not been carefully looked after in the first stages of the complaint it invariably runs into worse condition. From the clear discharge from the nostrils as before mentioned, it here takes the most offensive forms; becomes thick and clotted, stopping up the nostrils; and the cavities of the air passages being highly inflamed, continue to secrete the discharge. The eyes also become inflamed, and a frothy secretion exudes from the eyelids. The face and eyelids at length become swollen and the bird cannot see to feed. Here we have a troublesome case, and if the bird is valuable it should be at once removed to warm in-door quarters. We do not hesitate to say that there is no more contagious disease known to the feathered tribe; and any bird so attacked should be immediately removed from the rest. There is no doubt the disease is communicable in various ways, such as drinking out of the same water-vessel, the liquid being contaminated by the discharge. In the same way the food they peck off the grass in their runs holds upon it some of the matter coughed or sneezed up. It is only with birds of value that real attempts at cure should be made, which should be to purge out with a dose of castor oil first. Bathe the head and nostrils with a warm, weak solution of carbolic acid, keeping it from the bird's eyes. When the matter is free from the nostrils, slightly syringe (with a small syringe) some of the solution up the same. Well dry the feathers about the head and neck. Pills of the following parts should be always at hand, and one, night and morning, administered while the birds are ill; Quarter of an ounce valerian, quarter of an ounce of cayenne pepper, quarter of an ounce of lobelia in powder, quarter of an ounce of gum myrrh; make into forty-eight pills."

Carrier Pigeons.

The following observations will be welcomed by our readers, as they are from the pen of Col. Hassard, who contributed so ably to our Poultry Department for some years, and we hope will do so again:—

The variety of pigeons known as carriers are now bred entirely as fancy birds, and are of no use except as such. Their value being dependent on their points as laid down by fanciers, which standard it is very difficult to breed up to. I have proved they are very strong on the wing if allowed to fly, and I believe that if trained, the third or fourth generation would "home well." They would probably lose their fancy points and hence be valueless on that score.

The carriers as a bird used for the purpose of conveying messages is an entirely different bird, being probably a cross with the owl pigeon and an English dragon, or carriers of former days, and are crossed again with the owl, or a very similar bird in many respects and generally known as the "Antwerp carriers," or in England now, for shortness, often called "homers." Mr. Tegetmeier has written a very able work, price one shilling, on this subject, which I recommend all concerned in this very interesting bird to purchase.

It is well-known that in consequence of the use found for pigeons during the French war, both French and Prussians have established pigeon stations where the birds are under the orders and care of the government officers—engineers I believe. Possibly the English Government may begin some day, but the telegraphic communication throughout England being so perfect, it is thought it could hardly be of use I am not of this opinion; but think that certainly in Canada pigeons might be of use in many ways, as there is a vast extent of country without telegraphic communication. Accidents happen to trains, and a pigeon let fly might explain the whereabouts in a cold bright day after a snow storm. In places where no telegraph exists they could be trained to fly to the nearest station, so that if at a few telegraph stations pigeons were kept, places not yet wired could keep up news across the lakes also, and in many other ways.

I am willing to admit that they would run risks from hawks and gunners, too numerous to mention; but if the late magistrate of Margate, Kent, as narrated by T. M Eaton, could get (before the telegraph was invented) the leading articles of the *Morning Post* every morning from London, (70 miles or so), a good deal could be accomplished by birds similarly trained, and when once used to the journey and under way, hawks would have enough to do to catch a bird flying at the rate of a mile a minute, and gunners would have to shoot quick.

Homing birds require no more attention than common, unless to be used as flyers, when they would require a room, loft or aviary with traps; but they breed well and often are very hardy, and last, some may say, not least, make good pies. If people keep a few birds, even in an outside box against the wall, they might find it useful to keep homers, even if they do not train them long distances. 900 miles has been done; 500 is done every year by the Belgians, and shorter distances can be relied on perhaps with more certainty.

Embden or Bremen Geese.

These beautiful aquatic birds, were first introduced into this county in 1821, at which time they produced quite a sensation and for years thereafter brought fabulous prices. They were imported direct from Holland; but the appellation of Embden is said to have been obtained from the town of that name in Hanover In conversation some time since, with the editor of the German agricultural paper of New York city, we learned that a similar breed of geese are bred in or near Stettin, Germany, and have their origin in that neighborhood.

We have seen, on several occasions, very fine specimens of these geese at the New York State and other fairs, but the most magnificent birds of these breeds we ever saw, were shown at the New York and Connecticut State Poultry Exhibitions last year. If we mistake not specimens were shown at the former show which weighed, dressed, at nine and ten months old, from twenty to thirty pounds.

The flesh of these geese is very different from that of our domestic variety, neither does it partake of that dry character which belongs to other and more common kinds, but is as tender and juicy when brought to the table as that of our wild fowls, and is less liable to shrink in the process of cooking. Epicures wer that the flesh of these geese is, when properly cooked, not inferior to that of the Canvasback duck.

They are the most beautiful of all geese, and, excepting the Toulouse, the largest. Indeed, the rivalry between the two breeds is so close that many contend that the palm of size as well as of beauty belongs to the Embden. The young are easily reared, with very little care, in almost any section of the country. They have been bred to weigh, at eight months of age, from twelve to sixteen pounds when dressed for the table.

Mr Hewitt, an eminent breeder, who favors this variety, says:—"The Embden goose has prominent blue eyes, is remarkable strong in the neck, and the feathers, from near the shoulder to the head, are far more curled than is seen in other birds. The plumage is pure white throughout; bill flesh color, and legs orange. One of their great advantages is this:—That all the feathers being pefectly white, their value, where many are kept, is far greater in the market than is ever the case with colored or mixed feathers. The quality of the flesh is about equal with the Toulouse; but the Embden is the earlier layer, and frequently rears two broods in one season, the young ones proving as hardy as any with which I am acquainted."—*Rural Home.*

The Horse and Stable.

Raising Horses.

Horse breeding is a branch of farming which demands knowledge and close attention. To conduct it profitably a farmer must know what kinds bring the highest prices in the market, what are the causes of such prices, and how those causes will be likely to affect the market in the future. Particular attention should also be given to the best and most economical system of stabling, feeding, and training, so that by lessening the cost of production the profits may be increased. And beyond all, great care should be taken that only the very best mares, should be used. The practice among many farmers of using worn out, broken down, and blemished mares for breeding cannot be too strongly condemned.

At present there is a great and in all likelihood there will be a continuous demand for heavy draught horses consequent on the large and rapidly increasing traffic of the principal Canadian and American towns, and it therefore behoves our farmers to give especial attention to this important fact Thanks to the well directed energy and discriminating skill of many of our importing agriculturists, we have now in many portions of Ontario heavy draught stallions that cannot fail to exercise a marvellous influence on the character of the rising stock of the country, and we feel persuaded that our farmers generally will heartily support the profitable employment of these superior animals in the various localities to which they are introduced. Self-interest itself should strongly support such a course, for our American friends are continually scouring the country in search of first-class heavy draught animals, at prices ranging from two hundred and fifty to four and even five hundred dollars a-piece. Besides in most of our older farming districts deeper ploughing has become an inevitable necessity, and the light stamp of horses hitherto predominant throughout the country will prove very unsuitable for the purpose, and a heavier stamp of animals require to be substituted, a substitution that will be more generally acquiesced in, in consequence of the rapid extension of railways and the consequent diminution of long distances that farmers hitherto have been compelled to travel to market.

In choosing mares to breed from, the farmers should be careful to aim at perfection of style, constitution, and freedom from blemishes, and if he has no good mares of his own, will find himself amply repaid by purchasing one which combines these good qualities in as great a degree as possible. Whilst thus advocating the claims of the heavy draught horse, we must not be understood as deprecating the production of either blood or carriage horses. In their respective classes, and for special purposes, these animals are just as valuable as their neighbors of the heavy draught breed are in theirs But the exigencies of the times demand an increased number of the latter stamp, and we feel no hesitation in recommending the great bulk of our farmers to give especial care and attention to the breeding of heavy draught animals whether for the purposes of the farm or for disposal to either home or foreign buyers.

Check-Rein on Horses.

Mr. Geo. T. Angell, President of the society for prevention of cruelty to animals, says, in the *American Farm Journal*, the following on the subject of check-reins: If a man has a heavy load to push or draw, he lowers his head by bending forward, and throws the weight of his body against, or to propel the load—so does the horse under similar circumstances, if permitted. If the man's head were tied to a belt around his body so that he could not bend forward, he would lose the advantage of his weight, and could only pull or push with his muscles—so also with the horse or ox. If the man's head were thus kept in a perpendicular position, he could not so readily see where to step, and would be more apt to stumble—so also with the ox or horse. No one in the saddle would thus tie up the head of his horse, and no one would expect a horse thus tied up to win a race. Nor would any one think it an advantage to put check-reins on oxen.

The London *Horse Book* says:—"The horse is often prevented from throwing his weight into the collar by a tight check-rein—a useless and painful incumbrance, introduced by vanity, and retained by thoughtlessness, amounting to cruelty. Few of the London cab-drivers use check-reins, knowing them to be inconsistent with proper work; and, when one is observed, it will invariably be found to be on some poor animal, whose weary and haggard appearance is attempted to be disguised by this implement of torture. The check-rein is, in nearly every case, painful to the animal and useless to the driver. Because it fastens the head in an unnatural posture; and, as the horse's head and shoulder fall together, cannot be of any real support in the case of stumbling When, from some defect in the animal, or other cause, the check rein is used, it must be slackened Because, in addition to the easier position of the neck, a greater portion of weight can be thrown into the collar, especially going up hill, thus saving a great and unnecessary expenditure of muscular power. There is an important difference between a tight check-rein and a tightened rein, although not generally understood The first is injurious, and cannot help the horse, while the latter is often useful. Because, the latter is a steady support to the animal's head, from a distinct and intelligent source—the driver; whereas, the former is only the horse's head fastened to his own shoulders. That the check-rein is inconsistent with the action of the horse's head, is clearly shown by the fact that when a horse falls if is always broken.

Professor Pritchard, of the Royal Veterinary College, London, say: "I would therefore say that instead of preventing horses from falling, the check-rein is calculated to render falling more frequent. Other, not uncommon results of its use are distortion of the windpipe to such a degree as to impede the respiration ever afterwards, excoriation of the mouth and lips, paralysis of the muscles of the face, etc. It is a useless appendage, supported only by fashion. I feel that if this were more generally understood, numbers of excellent persons who now drive their favorite with check-reins would discontinue to do so."

Mr. Fleming, Veterinary Surgeon of the Royal Engineers, London, says: "I think nothing can be more absurd than check-reins. They are against reason altogether. They place the animal in a false position The horse stands with a check rein exactly as a man would stand with a stick under his arms, behind his back, when told to write."

Feeding Colts.

I give colts as many oats as they can at once eat up clean, feeding three times a day. They manage to take good care of about the following quantities in a day:—

	lbs oats.	lbs. hay
Weanlings,	4	8
Yearlings,	5	10
2 year olds,	6	10
3 year olds,	8	10

Once a week they received a warm mash, of bran and oats, and once a week they also have three or four pounds of potatoes each, in lieu of the usual feed. They would get other roots—preferably carrots—if I had them. Of course these quantities vary slightly, with the animals, but they show the average feed of colts at Togus farm.

My farmer neighbors look at them, and wonder at their size, power, and spirit, when there is no cause for wonder at all They not only have warm, clean, and ample boxes to move about in, but they are carded and exercised every day. To this end, the youngsters are daily compelled to half-an-hour's gallop in a large yard, while the two and three year olds receive regular work upon the road. They are all handled from birth. It may be objected that the farmer cannot afford to feed so highly. I reply that he cannot afford to do otherwise. He does not keep his growing boy upon a short allowance, but on the contrary, is in a state of chronic astonishment to see the quantity of provender the urchin can stow away under his jacket. We all know that children eat more than "grown" people. Why should not the same truth hold good with other animals?

Experience tells me that extra colts may be raised with extra care. If I fastened a yearling in a box or a stall, and kept him without exercise all winter, I should expect his legs to fill and "stock;" but I should attribute the disease to its proper cause, and not to the oats.

In conclusion I would say that at intervals we give sheaf oats, in lieu of hay; and during very cold weather, an occasional feed of corn-meal.—*Bolingbroke Cor. Maine Farmer.*

Do Horses Reason?

For many years I have made the horse a subject of careful thought and study. At times I have been led to believe that horses have reasoning powers, and can understand and apply them in various ways. For the last two years, I have driven my mare nearly every day over the same road. About one mile from my home are two roads, one leading to the church, the other to the depot. Now, six days in the week I drive to the cars, and on Sunday to the church. At the point where these roads separate, I give my mare her head, leaving her free to make her choice, and on week days she will go straight to the depot, and on Sundays she goes of her own free will to the church; I never knew her to fail me yet. It puzzled me for a long time to learn how she should know any difference in days; and I have come to the conclusion that she reasons from facts—facts connected with every day life. On week days I start from my stable in a two wheel carriage; on Sundays I start from my house in a carryall, thus making an entire change, both in time, place and carriage; and from these facts she must be guided in her choice of roads. Many say this is instinct; if so, where does reason begin?—O. W. FISKE, *in Our Dumb Animals.*

HOW TO FATTEN A HORSE.—To fatten a horse that has fallen off in flesh is sometimes a tedious business—indeed, the work of months. The following suggestions to accomplish it, however, though without paternity, look to us as wise and to the purpose: Many good horses devour large quantities of grain and hay and still continue thin and poor; the food eaten is not assimilated properly. If the usual food has been ground grain and hay, nothing but a change will affect any desirable alteration in the appearance of the animal. In case oatmeal cannot readily be obtained, mingle a bushel of flax-seed with a bushel of barley, one of oats and one of corn, and let it be ground to a fine meal. This will be a fair proportion for all his food. Or the meal, or the barley, oats and corn, in equal quantities, may first be procured and one-fourth part of oil-cake mingled with it, when the meal is sprinkled on cut food. Feed two or three quarts of the mixture two or three times daily, mingled with a peck of cut hay and straw. If the horse will eat that greedily, let the quantity be gradually increased, until he will eat four or six quarts at every feeding So long as the animal will eat this allowance, the quantity may be increased a little each day. Avoid the practice of allowing a horse to stand at a rack well filled with hay. In order to fatten a horse that has run down in flesh, the groom should be very particular to feed the animal no more than he will eat up clean and lick the manger for more.—*Farmer's Union.*

FEEDING HORSES.—The most natural feed for the horse is good pasture; the next is grass made into hay. But it must be grass made into hay after it is cut, not made or ripened while standing. On such grass or hay, when idle or at light work, a horse will keep in fair condition. If hard or fast work is desired, it will need, with such hay or grass, a suitable allowance of grain. If kept on dry feed a moderate allowance of carrots, in addition to other feed, will be a great help. Carrots not only promote the digestion of other feed, but they also tend to promote the general health and thrift of the animal. It is a question whether many farm horses are not grained too high—whether graining high and making them very fat in the winter, brings them into the best condition for work through the summer. Nature provides no grain for the wild horse, but nature does not make that horse work; men add grain to keep up the condition and strength while doing their hard work. Here, it seems to me, is the key to the rule for keeping horses, to wit: sufficient grain to keep them in condition when at work; but when idle, plenty of pasture, or of good, early cut and well made hay, should be all that is needed. If the hay is not good, or was cut late, an allowance of grain will be needed to make up its lack of nutriment. Horses should always be kept in good, smooth condition, but not over fat, and the feed should be gauged by this rule "F" *in Country Gentleman.*

Useful Tables.

Usual Distance for Trees and Plants.

Standard Apple Trees	30	feet	apart	each way.
Dwarf Apples	6	"	"	"
Standard Pears and Cherries	20	"	"	"
Dwarf Pears, Dwarf Cherries & Quinces	10	"	"	"
Apricots, Peaches, Nectarines & Plums	20	"	"	"
Currants, Gooseberries & Raspberries	4	"	"	"
Blackberries & Black Cap Raspberries	6 to 8	"	"	"
Grape Vines	12	"	"	"

Strawberries, in rows 2½ feet apart, plants one foot apart in the row.

Number of Plants and Trees Per Acre.

Feet apart.	No. of Plants.	Feet apart.	No. of Plants.
1 by 1	43,560	15 by 20	145
1½ " 1½	19,360	18 " 18	130
2 " 2	10,890	20 " 20	108
2½ " 2½	6,969	20 " 25	90
3 " 3	4,840	21 " 21	98
4 " 4	2,722	22 " 22	90
5 " 5	1,742	24 " 24	75
6 " 6	1,210	25 " 25	70
8 " 8	680	25 " 30	59
9 " 9	537	27 " 27	59
10 " 10	438	28 " 28	55
10 " 15	304	30 " 30	48
12 " 12	305	30 " 35	43
15 " 15	194	35 " 35	35

How to Weigh without Scales.

The following tables will very materially aid those housekeepers who do not have scales at hand, to measure any article wanted. Allowance should be made for extraordinary dryness or excessive moisture of the articles needed.

Wheat flour	1 lb. is	1 quart.	
Indian meal	1 lb 2 oz. are	1 quart.	
Butter, when soft	1 lb. is	1 quart.	
Loaf sugar, broken	1 lb.	1 quart.	
White sugar, powdered	1 lb. 1 oz. are	1 quart.	
Best brown sugar	1 lb 2 oz. are	1 quart.	
Eggs	10 eggs are	1 lb	
Flour	8 quarts are	1 peck.	
Flour	4 pecks are	1 bus.	

LIQUIDS, ETC.

Sixteen large tablespoonfuls are	½ pint.
Eight large tablespoonfuls are	1 gill.
Four large tablespoonfuls are	½ gill
Two gills are	½ pint
Two pints are	1 qt.
Four quarts are	1 gal.
A common sized tumbler holds	½ pint.
A common sized wine-glass is	½ gill
A tea-cup is	½ gill.
A large wine glass is	2 ozs.
A tablespoonful is	½ oz.
forty drops equal	1 teaspoonful.
Four teaspoonfuls equal	1 tablepoonful.

Usual Quantity of Seeds Per Acre.

	Pounds.
Beets & Mangel Wurzel	4 to 6
Cabbage	1 to 1½
Carrot	2 to 3
Cucumber, in hills	1 to 2
Clover, red, broadcast alone	15 to 20
Clover, sown on grain in spring, mixed with ½ bushel Timothy and 1 bushel Red Top	10
Clover, white, broadcast alone	10 to 15
Clover, white, in drills	8
Lucerne, broadcast	15
Onion, in drills	5
Parsnip, in drills	4 to 6
Radish, in drills	5 to 8
Radish, broadcast	12 to 16
Salsify, in drills	6 to 8
Spinach	8 to 10
Turnip and Ruta Baga, broadcast	1½
Turnip and Ruta Baga, in drills	1
	Quarts.
Beans, pole, in hills, 3½ x 4	8 to 12
Corn, in hills	8 to 12
Broom Corn, in hills	10 to 12
Millet, for seed	12
Mustard, broadcast	12
Sorghum, or Chinese Sugar Cane	2 to 3
	Bushels.
Beans, bushels, in drills, 2½ feet apart	1½
Corn for fodder	3 to 4
Barley, broadcast	2 to 3
Barley, in drills	1½ to 2
Buckwheat	1 to 1½
Hungarian Grass	¾
Kentucky Blue Grass	2 to 3
Lawn Grass	2 to 3
Millet, broadcast	½ to ¾
Oats	2 to 3
Orchard Grass	2 to 3
Peas, early, in drills	2 to 3
Peas, Marrowfat	1½ to 2
Potatoes, in drills or hills, cut tubers	10
Potatoes, cut in single eyes	3 to 5
Rye, Broadcast	1½ to 2
Red Top	2 to 3
Rye Grass	2
Sainfoin	2 to 3
Timothy	¾
Vetches	2 to 3
Wheat, broadcast	1½ to 2
Wheat, in drills	1½
Flaxseed	

Canadian Standard Weights Per Bushel.

Wheat	60 lbs	Turnip Seed	50 lbs.
Peas	60 "	Red Top Grass	8 "
Beans	60 "	Hungarian Grass	48 "
Indian Corn shelled	56 "	Millet	48 "
Corn in the Ear	70 "	Tares or Vetches	60 "
Rye	56 "	Rape Seed	50 "
Barley	48 "	Blue Grass Seed	14 "
Buckwheat	48 "	Potatoes, Turnips	60 "
Oats	34 "	Carrots, Parsnips	60 "
Clover Seed	60 "	Beets and Onions	60 "
Flax Seed	56 "	Castor Beans	40 "
Timothy Seed	48 "	Dried Apples	24 "
Hemp Seed	44 "		

A bushel contains 2150.4-10 cubic inches. Any box containing this equivalent may be used as a measure, thus —

A box 24in by 16in. square, and 2sin. deep, will contain a barrel.

A box 22in. by 15½in. square, and 8in. deep, will contain a bushel.

A box 12in. by 11¼in. square, and 9in. deep, will contain half a bushel.

A box 8in. by 8in. square, and 8in. deep, will contain a peck.

A box 8in. by 6in. square, and 4½in. deep, will contain one gallon.

A box 7in. by 8in. square, and 4½in. deep, will contain half a gallon.

A box 4in. by 4in. square, and 4½in. deep, will contain a pint.

Seed for Given Quantity of Ground.

ARTICHOKE; one ounce of seed will produce 600 plants.

ASPARAGUS, one ounce will produce 1,000 plants.

BEANS,—*English Dwarf*; one quart of seed will be required for every sixty feet of row. *Dwarf Kidney*; one quart will plant 250 feet of row. *Pole*, or *Running*; one quart of Lima, or Large Running Beans, will plant 300 hills or 250 feet of row.

BEET; an ounce is required to plant 50 feet of drill.

BORECOLE, OR KALE; one ounce of seed will produce 4,000 plants.

BROCCOLI; one ounce will produce 4,000 plants.

CABBAGE; an ounce is sufficient for 4,000 plants.

CAULIFLOWER; an ounce of seed will produce 4,000 plants.

CARROT; one ounce will sow 300 feet of drill.

CELERY, an ounce of this seed will produce 10,000 plants.

CORN SALAD; an ounce of seed will sow 15 feet of drill.

CUCUMBER; an ounce of seed is sufficient for 200 hills.

EGG PLANT; an ounce of seed will produce 4,000 plants.

LEEK; one ounce of seed may be allowed for 3,000 plants.

LETTUCE; an ounce of seed will produce about 10,000 plants.

MELON; one ounce of seed will plant from 125 to 150 hills.

MELON (WATER); one ounce of seed will plant from 40 to 50 hills

ONION; one ounce of seed will be sufficient for one perch or pole.

PARSLEY; two ounces of seed are required for three perches.

PARSNIP; two ounces of seed are sufficient for three perches.

PEPPER; one ounce of seed will produce 3,000 plants.

PEAS, one quart will plant from 150 to 200 feet of row.

POTATOES, ten to fifteen bushels are required for an acre.

PUMPKIN; one quart of Field Pumpkin, 500 hills; and one ounce of the finest kinds will plant from 50 to 80 hills.

RADISH; two ounces will sow three perches in drills; if sown broadcast, four ounces will be required.

SPINACH; if cultivated in drills, four ounces will plant five perches of land, if broadcast, it will require double the quantity.

SQUASH; an ounce of seed will plant from 50 to 100 hills, according to sorts and size.

TOMATO, one ounce of seed will produce 4,000 plants.

Meteorological Table.

[From observations at the Toronto Observatory.]

	Barometer, average of 31 years.	Temperature, average of 32 years.	Clouded Sky, average of 19 years.	Rain, average of 31-32 years.	Amount of Rain.	Snow, average of 29 years.	Amount of Snow.	Days of Rain and Snow.
		°			in.		in.	
January	29·6455	23·00	0·73	1·228	1·228	4·59	17·49	18·56
February	·6251	23·02	·72	0·894	0·894	4·00	10·31	10·56
March	·6011	29·68	·62	1·618	1·618	6·24	12·22	10·24
April	·5902	41·13	·60	2·439	2·439	10·00	2·39	13·63
May	·5700	51·62	·56	3·254	3·254	11·85	0·07	12·23
June	·5741	61·61	·53	2·078	2·078	11·91		11·91
July	·5945	67·29	·50	3·248	3·248	10·66		10·66
August	·6215	66·08	·48	3·021	3·021	10·81	0·67	10·81
September	·6703	58·01	·50	3·716	3·716	11·06	3·28	11·06
October	·6445	45·80	·61	2·380	2·380	12·50	14·14	12·50
November	·6113	36·53	·74	2·077	2·077	10·03	13·59	10·03
December	·6492	25·84	·75	1·654	1·654	5·72		5·72
Year	29·6104	44·15	0·61	29·416	29·416	109·37	69·77	172·19

	Days of Snow, average of 32 years.	Total Rain and Snow.
		in.
January	1·61	2·917
February	6·88	2·825
March	13·59	2·840
April		2·678
May		3·201
June		2·078
July		3·248
August		3·021
September		3·716
October		2·476
November		3·305
December		3·068
Year	82·82	36·383

Advertisements.

CONTENTS OF THIS NUMBER.

THE CANADA FARMER is printed and published by the GLOBE PRINTING COMPANY, at 26 & 28 King Street East, TORONTO, CANADA, on the 15th and 30th of each month. Price one dollar and fifty cents per annum, *free of postage*.

GEORGE BROWN, Managing Director.